OFFICE OF CONSERVATION

STATE OF LOUISIANA

IN RE: APPLICATION OF

HELIS OIL AND GAS COMPANY

LACOMBE BAYOU FIELD

DOCKET NO. ENG 14-0626

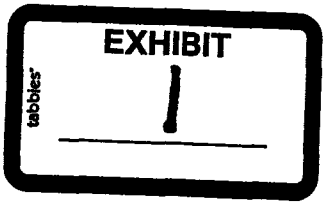
ST. TAMMANY PARISH

REPORT OF HEARING

HELD AT

MANDEVILLE, LOUISIANA

NOVEMBER 12, 2014



(Whereupon, the following is a copy and excerpt of the original transcript in this matter.)

DOCKET NO. ENG 14-0626

LACOMBE BAYOU FIELD

* * * *

MR. HENRY:

Good afternoon, and welcome to the Office of Conservation hearing for Docket No. ENG 14-626. My name is Daniel Henry, and I am an attorney with the Office of Conservation. I have been designated as the hearing officer by the Commissioner for tonight's hearing.

I would first like to thank Superintendent Trey Folse, Principal Wagner, Assistant Principal Alleman, the Mayor for the PA system, and all the others here at Lakeshore High who assisted the Office of Conservation in holding this hearing here.

The Commissioner chose to hold the hearing here in St. Tammany Parish so that the citizens could be here to witness the presentations on both sides of the issue and to make it easier for the citizens to offer their statements in support of or in opposition to the well permit application being discussed today.

My duty as the hearing officer is to make sure

that a clear and accurate record of these proceedings is made. Please do not disrupt the testimony, presentations, or any of the comments of the speakers or presenters, as such only tends to distort or mask the recording and makes the job of the court reporter more difficult.

At this time, I ask if anyone has a cell phone or a pager or any other type of PDA-type device, if you would turn those off, it would be appreciated.

AUDIENCE MEMBER:

We cannot hear a word you're saying.

AUDIENCE MEMBER:

The lady said she can't hear.

MR. HENRY:

If people are having trouble hearing, if they can kind of come where the speakers are. Unfortunately, this is the best set up we have to project the sound to the audience. So, if folks can't hear, if you can come closer. Here are the two speakers (indicating).

The purpose of tonight's hearing is to hear testimony and statements related to Helis Oil and Gas's drilling permit application for the Eads Poitevent, et al, No. 1 Well. This well permit application was filed with the Office of Conservation on or around September 3, 2014, and this hearing,

requested pursuant to Louisiana Revised Statute 30:6, on September 15, 2014.

At this time, I will file and record the appropriate State exhibits into Docket No. ENG 14-626.

Conservation Exhibit No. 1 is a copy of the well permit application filed by Helis Oil and Gas for the Eads Poitevent, et al, No. 1 Well.

Conservation Exhibit 2 is a copy of the letter from the Town of Abita Springs and the Concerned Citizens of St. Tammany requesting the hearing tonight.

Conservation Exhibit 3 is a copy of the letter with exhibits to the Town of Abita Springs, the Concerned Citizens of St. Tammany, and Helis Oil and Gas granting the hearing request, prescribing the rules for the way the hearing is to be conducted.

Conservation Exhibit 4 is a copy of the Office of Conservation's promulgated procedures for hearings.

Conservation Exhibit 5 is proof of publication of the meeting notice for this hearing in the Louisiana *Advocate* on October 3, 2014.

Conservation Exhibit No. 6 is the proof of publication of the meeting notice for this hearing in the *St. Tammany Farmer* on October 9, 2014.

Conservation Exhibit No. 7 is a copy of the

prehearing memorandum that was submitted on behalf of Helis Oil and Gas.

Conservation Exhibit No. 8 is a copy of the prehearing memorandum that was submitted on behalf of the Town of Abita Springs and the Concerned Citizens of St. Tammany.

Conservation Exhibit No. 9 is a written statement that was passed out before and during this hearing, including information relative to oral statements and written statements submitted within the comment period.

Finally, Conservation Exhibit 10 is reserved for any written statements submitted in association with today's hearing.

Prior to starting the hearing, it is important for everyone to understand that the first part of this hearing tonight will include testimony from the well permit applicant, Helis Oil and Gas, and the hearing applicants, Town of Abita Springs and Concerned Citizens of St. Tammany Parish.

While the hearing applicants were given the option of a hearing consisting of only public comments, they felt that being able to present testimony prior to said comments would allow both proponents and opponents to outline their positions

prior to receiving the public comments. Again, I ask you, please, be courteous to the presenters or you will be asked to leave and escorted out of the building by security.

Many of you are probably here to make comments or statements in support or in opposition to the well permit application. As I inferred a moment ago, after the presentations by Helis Oil and Gas, the Town of Abita Springs, and the Concerned Citizens of St. Tammany, the second part of the hearing will allow individuals to make oral statements or submit written ones in accordance with the Louisiana Administrative Code.

Due to the anticipated volume of statements, these statements will initially be limited to five minutes. If someone would like to speak for longer than five minutes, extra time will be afforded once everyone has been given the chance to speak.

Also, while the public is more than welcome to come up and make statements, please, understand that both spoken statements and written statements will be given the same weight.

We handed out a slip of paper to everyone, and if you do need to submit written statements, the information is contained on that slip. Please

reference Engineering Docket 14-626, Eads Poitevent, et al, No. 1 Well. As the paper states, the deadline for written statements is 5:00 p.m. on November 19, 2014.

On your way in, we had attendance cards where the members of the public could print their name, address, residence, indicate their position on the well permit, and also indicate whether or not they would like to speak. If you have not filled out a card and you want to, please, quietly make your way over to the sign-in table up front, and if you could do so while Helis is making their presentation and do it quietly, you know, we can collect those cards shortly.

These speaker cards will be called in the order in which they were submitted, and while we are going to go with that order, we will give preference to the residents of St. Tammany Parish. We're going to pull those cards first.

We're going to now go into the evidentiary presentation portion of this hearing. Please understand that both parties have invested much time and effort into these presentations, and, please, afford them the respect that they are due for that.

Also, while we typically have our hearings in Baton Rouge, we're in a gym this evening, as you guys

can tell, so if you can keep it down so that the court reporter's equipment -- so we won't have any echoes and we can have an accurate recording of tonight's hearing.

All right. Nobody has some opening statements, so, Helis, if you guys want to get started with your presentation.

MR. REVELS:

Do you want to swear them in?

MR. HENRY:

Yes. We're going to swear in all the witnesses at once. If the witnesses would raise their right hand and repeat after me?

(Witnesses sworn.)

MR. REVELS:

Hi. I'm Rick Revels. I'm representing Helis Oil and Gas tonight. I am joined by three distinguished witnesses, Bill Dale, a consulting petroleum geologist with over 30 years of experience; Ted Bourgoyne, a PhD petroleum engineer, former Dean of the College of Engineering at LSU; and John Conner, an environmental engineer also with over 30 years of experience.

All have previously qualified and testified before the Office of Conservation, and it is our task tonight to present testimony and evidence to establish

convincingly that Helis has fully satisfied the requirements for issuance of a drilling permit on lands under lease to it in a newly-established Tuscaloosa Marine Shale unit in Lacombe Bayou Field, and in addition, Helis has made substantial efforts, of course, to minimize any adverse environmental impacts or risks and inconvenience to the general public.

We'll begin first with Mr. Bill Dale.

For the benefit of those in the audience, Mr. Dale, if you would, please, state your name for the record and briefly summarize your education and work experience that have qualified you to testify on numerous prior occasions in the past as an expert in petroleum geology?

MR. DALE:

Thank you, Rick.

My name is Bill Dale. I received my bachelor of science from Louisiana State University in 1978, and I have over 35 years of experience as a petroleum geologist in the oil and gas industry.

I have previously testified as an expert witness in petroleum geology before the Office of Conservation.

MR. REVELS:

I would ask that Mr. Dale's qualifications as an

expert again be recognized.

MR. HENRY:

Mr. Dale's qualifications are recognized.

MR. REVELS:

Have you given them the booklets of exhibits?

Excuse me just one minute.

Whereupon,

BILL DALE

was called as a witness on behalf of HELIS OIL AND GAS COMPANY, and, after having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION OF BILL DALE

BY MR. REVELS:

Q The exhibits that you are about to discuss, were they prepared by you or under your direct supervision?

A Yes, sir, they were.

Q All right. Let's turn to your first exhibit, please, and this is just a little summary information on Helis Oil and Gas.

A Right. Helis Oil and Gas is a privately-owned oil and gas exploration company based in New Orleans since 1934. Helis has owned and operated throughout the nation and has extensive operations on private, federal, and state lands, as well as federal offshore waters and inland state waters in Louisiana.

In recent years, Helis has drilled and hydraulically fractured approximately 60 wells such as the one planned for here in Lacombe Bayou.

Helis employs the best practices in the industry and strives to meet or exceed all applicable safety standards.

Q All right. Now if you would flip over to your next exhibits, please, if you would locate the subject unit in which Helis seeks to drill a test well in relation to the TMS wells drilled to the northwest?

A Yes. This exhibit is a regional map that shows the Florida parishes, and you can see St. Tammany Parish on the eastern side. It is highlighted in red. This map is to show where current oil and gas activity in the Tuscaloosa Marine Shale is occurring right now and where it is in relation to the Helis proposal.

In the middle of St. Tammany Parish, it's labeled Helis unit, that is the unit that was created by the Commissioner, the one that we testified to -- or I testified to in June, and you can see, I show a distance there of 40 miles, that's the distance to the nearest producing well in the Tuscaloosa Marine Shale.

The stars up in the upper portion of this exhibit are wells that are either permitted, currently drilling, being completed, or are under production,

and you can see right in the top portion of the exhibit is the Louisiana-Mississippi state line, so you can see that most of the activity is there.

This activity started in earnest in 2011, by Devon and EnCana. Those are the first two companies that started out here. Since that time, there have been 21 wells either -- that I have identified here, so in three years, 21 wells.

Now, a little bit more activity is occurring in Mississippi. There are some indications of stars there. There are 47 wells. So that's just an indication of where the activity is.

And if we look at -- further look at the right-hand portion of the exhibit, you can see I've circled and drawn a line between, you know, a nearest well up there, which is labeled "A," and it goes down to St. Tammany Parish nearby the Helis unit, A', that is a line of section in which I'll show you the Tuscaloosa Marine Shale and how it relates to the area up in Tangipahoa Parish to St. Tammany Parish.

Q All right. And you're talking about Tuscaloosa Marine Shale or we may say TMS throughout this hearing a little bit. The unit was only established for that one interval, correct?

A That is correct.

Q All right. So we need to identify what that target interval is. If you would turn over and then discuss your line of section on the next exhibits?
A Okay. The next exhibit, this is a line of section that I showed at the hearing that we had on this matter, that was on June 17, 2014. This line of section was shown, and the Commissioner adopted the definition for the Tuscaloosa Marine Shale, which is shown on the very far right portion of this exhibit.

As I previously said, this is a line of section that starts to the north which is a well on the far left and goes through a series of wells to the right, all the way down to a well -- this is a Wagner and Brown, Keller Heirs Well, the one that's shown on the far right, and it's approximately two-and-a-half miles from the unit that we had established for Helis.
Q All right. Now if you would turn over to your next exhibit, and just briefly discuss the various strata that is situated immediately above and below the TMS?
A Yes. This is a demonstration of the section that Helis intends or plans to drill down through. This is a composite of two well logs. For the most part, the well log portion is the Wagner and Brown, Keller No. 1, but we've also included another well that has a

well log that goes all the way close to the surface which shows the entire section.

So, starting at the top which is colored in blue up on the screen and the exhibit I have is the -- it's a freshwater section, and the base of the freshwater in this area has been identified as +/-3,400'. Now, that information can be obtained from this well log, as well as published information, so this -- 3,400' is the depth of the freshwater, and you can see as you are going down, there are a number of aged sections that we go down through. The Tuscaloosa Marine Shale is located at the very bottom of this exhibit at +/- 13,000', and if you'll look on the left, I have a demonstration of -- it's 1.8 miles below the base of the freshwater.

Q Okay. So the target interval is close to two miles below the deepest -- just the base of the deepest freshwater aquifer; is that correct?

A Well, 1.8 miles is where I measured here to be below the base of the freshwater, so...

Q All right. And speaking of aquifers, let's turn to your next exhibit, and if you would discuss the outline of the Southern Hills Aquifer?

A The next exhibit is a published map that shows the extent of the Southern Hills Aquifer system, and

you can see it's rather broad. It goes -- includes the Florida parishes, as well as it goes a fair distance up into Mississippi.

One point I want to make here is that there have been a number of oil and gas wells drilled in the Southern Hills Aquifer system. I did a check, and as far as just the Florida parishes only, there are approximately 1,700 oil and gas wells that have been drilled through that, and then, in Mississippi, there are thousands more that have been drilled through this Southern Hills Aquifer system in search for oil and gas.

Q All right. Let's turn over now to your next exhibit, and although drilling in St. Tammany is not a very common occurrence in recent times, we do see a number of, not water wells, but oil and gas wells that have been drilled in the parish. Would you discuss that, please?

A Right. And that's what I'm trying to show here with this exhibit, where the wells were drilled in the parish. Of course, the parish is outlined here. The Helis unit is shown and labeled in the middle, and as I've previously mentioned, there is a distance shown of 2.5 miles to the nearest dry hole, that is the Wagner and Brown, Keller No. 1 Well. Then I'm also

showing here that the nearest producing well is far south in the lake. So we're 11.7 miles from the nearest well that produced oil and gas and 2.5 miles from the dry hole.

In total, there are over 76 oil and gas wells that have been drilled in the parish. The initial well that was drilled below the base of the Southern Hills Aquifer was drilled in 1929, to a depth of 3,966', and then it wasn't until 1940 when another well was drilled truly down below that in search for oil and gas, down to 8,300', so a total of 76 wells.

Q Okay. One of the requirements to get a drilling permit is to show structures within 500' of the location on a survey plat. If you would turn to your next exhibit, and comment on the plat that was actually attached to the permit application?

A This is -- the next exhibit is the plat that was attached. This is a typical plat that is submitted that a surveyor will prepare. They've stamped and certified which identifies the well location with X/Y coordinates and distances to lease lines, section lines. It just identifies the spot in space where somebody can find it at any time, so the coordinates on here are good for that.

Q And the certification from the surveyor is on

that, as well?
A That is correct.
Q All right. Let's widen -- if you'd turn to your next exhibit, let's widen the scope a little bit and move out from that 500' radius and talk about any structures close to the proposed drill site?
A Right. One of the requirements is to -- for the surveyor to go out and identify any structures within 500', and this exhibit demonstrates, well, that they did that, but also there is a circle that is drawn around the well site. It's a one-mile radius circle, and there are no structures within that distance.

I've also identified some other key points here, that we are 1,330' -- 1,837' from I-12 and 1.2 miles from the -- I guess we would call it the edge of the school property here where they turn into the school. I've also shown a distance of 7.17 miles to Abita Springs. They are one of the parties that called for this hearing, so I thought it appropriate to show the distance to the town there.

Q Okay. So, if I'm looking at this right then, Mr. Dale, there's no structures within the 500' radius that the surveyor had to certify to, but also, more than ten times that distance there is no structures within that radius, correct?

A That is correct.
Q I guess the most important structure that we've identified on this would be where we're sitting tonight, at the high school?
A That is correct, yes, sir.
Q All right. Now what about this next exhibit which is related to it?
A The next exhibit just gives a little bit more detail. I intend to show here the access road that Helis would like to use to access the location. It is an existing road, and by using this road, it would minimize the effects on other areas. It is an existing road and would be the best one to access this location, and, quite frankly, it's quite a ways off of Highway 1088.
Q All right. Now you have a series of aerial photographs. We thought it might be of some interest to the Conservation staff and to the audience as how the property has been used in the past and how it is presently being used. If you would go through very -- in a summary fashion the next few aerials?
A Yes. This next series of exhibits, I wanted to show land use over the past +/- 30 years. So we'll start in 1985, and I started here because it shows that the area around the Helis well site has recently

been clear cut or been cut for pine trees so it's probably getting for replanting, and what I'll show as we go through these next series of exhibits is the cycle. I mean, this is pine farm where you plant and grow and cut trees, and it cycles.

Starting in '85, if you'd look at this plat, you can see the unit we've created. On the very bottom portion of it is the Helis well site, that area has been cut of pine recently, as well as the areas up above, north and south of Highway 1088.

So we go to the next exhibit, 1998, this is to show the area around the well site now it's a little bit darker shaded color which means that the trees have grown. They're maturing in that area. Just to the west of it is an area that is lighter shaded, that area had been recently cut. So it's a cycle that we go through where one area is cut and replanted, the other area is grown up in trees, and as we go through the exhibits, you'll see that cycle.

We'll go again to 2005. You can see that the -- at the well site, there is no distinguishable area there where trees had been cut recently. It's all growing up in trees, but there is a fresh-cut area up in the northeastern portion of the unit, and I'm showing that because I'll go into a rather quick cycle

over the years where we'll see this school, where the property is being developed for that. This is strictly to show how different areas are cut at different times, trees grow and until its maturity and then cut again.

Q All right.

A So let's go to 2006, and I have a flag or an area shown there where Lakeshore High School will be built. The next exhibit in 2007, we'll see that. You can see that same cut area in the northeast corner of the unit, and then a new cut area to the south of Highway 1088, and you'll also start seeing a development being built just to the north side of the interchange of I-12 and 1088.

Q Okay.

A The next exhibit, 2007, this is the next year. Lakeshore High School is being built. You can see the development north of the interchange between 1088 and I-12 being developed over there.

On these sets of exhibits, I will start to show a blow-up or detail of the well location site just to show the trees. You can see that that area now has been cut too, and as I go through the next cycle of exhibits, you can see where it will be planted, and the rows of trees will grow up.

You'll also see on here, and I haven't mentioned before, but there are a number of areas crossing the property where we have labeled power lines, gas pipelines, there are a couple of them there. There is a new north-south pipeline that is just to the west of the location. So there are a number of other features on this property which it is being used for, for power, gas, for whatever has gone across here, and it's been used for that.

If you'll go to the next exhibit, 2009, I primarily wanted to show on this the exhibit on the right where I've blown up the well site, and you can see a little road there very close to where I've spotted the location, and what that is is a staging area for the trucks that came in and where they were planting trees here, and that is the cycle that I've talked about where trees have been cut, they'll come in replant them, and grow.

So, if you'll go to the next exhibit, in 2010, you'll see the rows. It looks like a crop has been planted, and that is precisely what it is, and you can see the location there.

Q In fact, Mr. Dale, isn't this whole property, not just the subject unit, but the big area around it under a long-term timber lease that is now operated by

Weyerhaeuser? So, I mean, everybody has heard of Weyerhaeuser. It's just a very big timber operation; is it not?

A That is correct, yes, sir.

Q All right.

A And then, finally, my exhibit for 2013, this is the most recent exhibit I have. You can see that the -- let's look first to the right, to the blow up of the detail of the location because you can see the trees are growing more. You can still see the rows of -- where they were planted, that they're definitely getting bigger now, so that cycle is ongoing.

I've also shown on here, and this is part of the permit package that Helis submitted, but if you'd look on the very bottom portion of the unit, we have the Helis well site, where the location is, but I've also shown the lateral that Helis would like to drill, if, in fact, the results from the vertical hole that they intend to drill here -- if the results from the vertical hole are good, this is the lateral that they intend to drill. So you can see it goes from the surface location all the way in a northerly direction to the northern portion of the unit. I've labeled it there "proposed bottom-hole location." It's 12,773' below the surface, and that's what the plan is and

that's where they expect the Tuscaloosa Marine Shale to be, that's 2.4 miles below the surface.

Q Okay. You know, everybody here, there is obviously going to be some people here that are not used to unitization, are not used to TMS development, but isn't it true that the TMS cannot be commercially developed without drilling and completing horizontal laterals which are generally oriented north-south direction, so Helis --

MS. JORDAN:

I'm going to object to the leading nature of the question. I'm sorry. I let a lot of it go, but it's a (inaudible). Thank you.

MR. HENRY:

Would you like to rephrase?

BY MR. REVELS:

Q All right. Let me ask you this. Of the 60-or-so wells drilled in the TMS so far, haven't they been completed with a horizontal lateral?

A Yes, sir, they have.

Q And generally speaking, is the orientation not north-south or drilled south to north or north to south?

A Yes, sir, that's correct.

Q Okay. So, my point to you is, now that a unit

has been formed, if you want to drill a unit well, which that is Helis's intention --

A Yes, sir.

Q -- they have to locate either on the north side to drill the lateral southward or they have to drill on the south side and drilled northward; is that correct?

A That is correct.

MS. JORDAN:

Objection, again. I'm sorry. The questions could be phrased so that the witness is the one testifying and not the attorney, that would be the best thing. Thank you.

MR. REVELS:

Let me just make one comment.

MR. HENRY:

If you could rephrase the question. I'm going to sustain the objection.

With that being said, when everybody claps, the court reporter has trouble due to all the echoes, so if we could be that down, it would be -- I'm sure she would appreciate it.

MR. REVELS:

And I'm going to make this one comment. We're not under Rules of Evidence. If you -- the

Rules applicable to hearings are moot, and leading questions are not objectionable.

BY MR. REVELS:

Q But be that as it may, let me ask you this one last question.

In your opinion, would it be better, from the standpoint of disruption to the high school and to traffic, et cetera, to locate on the north side or the south side of the existing unit?

A Right. Helis selected a location on the south side of the unit, the very far south of the unit, to drill in a northern direction, and as you can see, it is as far away from the school as it possibly can get.

Q All right. And in your expert opinion, is the chosen drill site at an optimum location to efficiently and economically drain the unit and to minimize the environmental impact and disruption or inconvenience to the public?

A Yes, sir.

MR. REVELS:

Our next witness is Dr. Ted Bourgoyne.

MS. JORDAN:

Are we allowed to do the cross? I mean, I thought I was going to be able to do a cross-examination after the witness finished.

It's very confusing for me to have to wait for all of them to testify before doing a cross.

MR. HENRY:

I think I'm going to have to go with Ms. Jordan, and I'm going to let her go ahead and cross the witness.

MR. REVELS:

This is not -- let me just -- can I just at least object to her point?

Rule 14 says, the applicant shall first present the entire geological, engineering, or other basis of support.

So, if you want to follow what is done in hearings, all of our experts testify before anybody is crossed.

MS. JORDAN:

I object to that. We've said earlier that this was supposed to be --

MR. REVELS:

We know you object to it. I'm just saying, are we going to follow the rules or not?

MR. HENRY:

We'll take the objection under advisement at this time, and we're going to go ahead and let him finish.

MR. REVELS:

Okay. We're going to turn now to Mr. -- Dr. Ted Bourgoyne.

MS. JORDAN:

So it's denied. So I just want the record to reflect that it was basically denied. If you take it under advisement and I'm not allowed to do the cross right now, then, obviously, it's denied because my request was to do the cross right now.

MR. HENRY:

That is correct, and you will have your chance to cross-examine once he finishes.

MR. REVELS:

As I said previously, our next witness is Dr. Ted Bourgoyne.

MR. REVELS:

Although, Dr. Bourgoyne, you've already qualified and testified as an expert before the Office of Conservation, I ask that you state your name for the record, and then briefly summarize your education and work experience that have qualified you to testify as an expert in petroleum engineering.

MR. BOURGOYNE:

My name is Adam T. Bourgoyne, Jr. I'm a

professional petroleum engineer registered in Louisiana. I have BS, MS, and PhD degrees in petroleum engineering and 45 years of experience.

I have 29 years of academic experience at LSU. I retired from LSU in 2000 as Dean of Engineering.

Since that time, I have had 12 years of experience with Tuscaloosa trend wells, deep Tuscaloosa trend wells, in Pointe Coupee and West Baton Rouge Parish.

MR. REVELS:

I would request that Dr. Bourgoyne's qualifications again be recognized.

MR. HENRY:

The witness's qualifications are recognized.

Whereupon,

ADAM (TED) BOURGOYNE, JR.

was called as a witness on behalf of HELIS OIL AND GAS COMPANY, and, after having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION OF ADAM (TED) BOURGOYNE, JR.

BY MR. REVELS:

Q And, Dr. Bourgoyne, were the exhibits you are about to discuss prepared by you or under your direct supervision?

A Yes.

Q All right. If you would first summarize briefly what you've reviewed in connection with this hearing?
A Primarily, I did a drilling engineering review looking at the regulatory requirements for a drilling permit. I looked at public data available for wells near the geologic prospect. I reviewed the Helis drilling permit application, and looked at the proposed unit hearing information in Docket No. 14-232, and also reviewed the Helis drilling program that was prepared by Seidel Technologies.
Q All right. Dr. Bourgoyne, would you, please, discuss then the regulatory requirements that exist with respect to issuance of a drilling permit for a well to be drilled in search of oil and gas under both LA R.S. 30:28 and Statewide Order 29-B?
A Yes. The regulatory requirements for a drilling permit in Louisiana are covered primarily in Louisiana Revised Statute 30, Section 28, and also Conservation Statewide Order 29-B, Section 103.

If you'll look in Louisiana Revised Statute 30:28, it pretty much lays out the State law in this area, that requires payment of certain drilling fees, providing a well location plat, as was discussed by the previous witness. It also indicates that, if there is a structure, residential or

commercial structure, within 500' of the proposed well site, then the Commissioner can have a hearing like this, if so requested by those affected.

AUDIENCE MEMBER:

I can't hear you.

MS. JORDAN:

I can't hear him either, actually.

MR. HENRY:

Well, if you can get closer to the microphone, I think it will help.

AUDIENCE MEMBER:

We can't hear anything.

MR. HENRY:

As I explained earlier, this is the PA system we have, and I apologize that people on the outskirts cannot hear. With that being said, we -- this is the best we have, and the witnesses are testifying, if you can give them respect.

Also, keep the applause down because the court reporter is having trouble hearing echoes.

Thank you.

DR. BOURGOYNE:

I will speak slower and closer to the mic and see if that helps.

A Revised Statute 30, Section 28 requires the

payment of certain drilling fees, drilling permit fees, a well location plat, and the statute indicates that the Commissioner has the sole authority to issue permits.

The Commissioner is also given the authority and responsibility to promulgate regulations having to do with surface water quality and certification and also groundwater aquifer safety.

The statute also indicates that a 30-day pre-entry notice must be given.

These same areas are covered in Conservation Order 29-B, Section 103, which is basically the regulations that promulgate the requirements of Louisiana Revised Statute 30:28. It indicates that the application has to be made on a Form MD-10-R, that location plat requirements are spelled out, and the requirement to the pre-entry notice. It also requires --

MR. HENRY:

Can you hold on for a second?

AUDIENCE MEMBER:

We can't hear a word you're saying.

MR. HENRY:

We're going to take a small recess and try to see if this guy can help with the sound.

(Brief recess.)

MR. HENRY:

Okay. The speakers are good. We're going to try this again. If not, we'll have another recess.

So if you want to continue.

BY MR. REVELS:

Q All right. Dr. Bourgoyne, do you want to continue, did you finish your discussion of the requirements for issuance of a drilling permit?

A Yes, I think I have.

Q All right. And, based on your review of both the applicable requirements and Helis's drilling application and related materials, is it your expert opinion that all requirements for granting of the permit have been fully satisfied?

A Yes.

Q All right. Your next exhibit gives us an idea of how common the issuance of drilling permits are in Louisiana. What comments would you like to make with regard to this exhibit?

A Basically, this is a record pulled from the Department of Natural Resources's website of dealing with onshore oil and gas permits issued so far in 2014. We can see from this that it is a very common

occurrence, in that, somewhere between three and five permits each month have been granted.

In addition, within those permits, Tuscaloosa Marine Shale permits have also been issued, and much lower, of course, in number, somewhere between zero and two permits per month have been issued during 2014.

Q And would it then be on a yearly basis somewhere on the order of 1,500 the last few years, is that right -- 1,500 drilling permits a year?

A That's approximately correct.

Q Okay. All right. And although drilling has not been a common occurrence in this parish, at least in recent times, if you would briefly discuss whether numerous have been drilled in the general area in the past by reference to your next exhibit?

A The next exhibit shows nearby wells with emphasis showing up to like a ten-mile radius. We see that there are a significant number of nearby wells but not a great number.

Also, we see that the wells tend to trend, the ones of most interest from the standpoint of reviewing drilling plans, the closest well of interest are the ones that trend to the southwest, more or less, paralleling I-12.

Q All right. Would you agree that the relatively small number of wells previously drilled in this area have more to do with the lack of success that prior operators have had rather than any other factor?
A Yes. Most of these wells have not been completed as producers. They were drilled and abandoned.
Q But the Helis project, of course, is new and different. It's a shale development. It's a fairly recent phenomenon, and Helis does believe it has a chance of success drilling at the chosen location; isn't that correct?
A That's correct. There is evidence that the Tuscaloosa Marine Shale may be amenable to horizontal drilling and stimulation by hydraulic fracturing.
Q All right. Your next couple of exhibits, I'd ask you to turn and discuss the geologic environment that Helis is likely to encounter based upon your review of these nearby wells, both mud weights and temperatures?
A Yes. The mud weights are important in developing a drilling plan, in that, it says how heavy a mud weight is going to be required in order to balance the formation pressure.

We can see the mud weights used in nearby wells has not been very high that we can drill to the target depth with a 10.5-pound-per-gallon mud, and that the

Tuscaloosa Marine Shale interval is just slightly higher pressured than normal. These mud weights are generally much lower than you would see in many high-pressure south Louisiana wells that would require 16 to 18 pounds per gallon.

Also shown are the temperatures that were seen in nearby wells, and, again, these temperatures are not particularly high from a drilling and completion standpoint and would not offer any unusual challenges.

Q All right. Based on your review of the well data from the nearby wells, in your professional opinion, is it reasonable to assume that the Helis test well will fall within a similar range as to both pressures and temperatures, and what are the implications of that?

A Yes. This would be a normal way of planning this, to base it on nearby wells, and that generally holds true.

What this indicates is that this Tuscaloosa Marine Shale prospect well is not a difficult well to drill. Its temperatures and pressures and so forth are not excessive. It's not a high-pressure well, not a high-temperature well. The target is low permeability, so it can't flow very fast. There is no indication of H_2S in any of the available data.

The aquifers will also be protected by three casing strings, and the target within the Tuscaloosa Marine Shale, kind of the sweet spot where the lateral might be planned, would be at 12,894' about, and that is 1.8 miles below the aquifer.

Q All right. Dr. Bourgoyne, you've mentioned that the plans of Helis will require completion of a horizontal lateral using hydraulic fracturing, and our next witness, Mr. Conner, will go into more detail about that, but from your expert opinion, your standpoint, why can't Helis simply drill and complete the well without using this technique?

A Well, a shale formation like the Tuscaloosa Marine Shale formation does not have enough permeability. It will not flow fast enough to be commercial without using this new technology.

Q All right. If you would now, turn to your next exhibit, and discuss how Helis plans to drill and complete the proposed well?

A Looking at this exhibit, if you'll look at the top, you can see there is quite a bit of information summarized in the well plan given in columns.

To the left is the type logs which was discussed previously by Bill Dale that is sort of a composite type log from two different wells, one well we had a

log through the aquifer and another that was more representative of the deeper formations to be drilled.

The next column gives a lithology description of the different formations that will be encountered, and then we see the estimated pore pressure column, again, the pore pressures are not very high, and the anticipated mud weights that will be used in the well plan in order to drill down through the target.

The initial well, the Phase 1 well, that the permit has been requested for will be a straight well, and it would drill vertically through the target. And if you pan to the right and look at the well schematic, we see more detailed information on the casing program that would be involved and some of the pertinent information on how the interval would be drilled.

For example, you can see that a diverter system will be used, as was requested by the Office of Conservation. The surface hole will be drilled with a 17-1/2" bit and a water-base mud. There will be closed-loop solids control systems used, and there will be no pits, no earthen pits, either lined or unlined. Steel tanks will be used in a closed-loop solids control system with all the waste mud and rock cuttings being generated being removed as they are

drilled.

The surface hole will be control drilled or drilled slowly to limit how fast the cuttings are being generated with the bigger 17-1/2" bit.

There will be a truck management plan to ensure that there will be no trucks moving through school zone hours, two hours in the morning and two hours in the afternoon, at the time school is coming in and going out.

The 13-3/8" surface casing will be set at 4,000', which is about 600' below the freshwater aquifer, and cemented back to the surface with cement continuous from the bottom all the way back to the surface.

If we focus on the bottom left side of this exhibit, we see the Tuscaloosa Marine Shale target shown, and there's got a little sweet spot of high resistivity and other indications within the Tuscaloosa Marine Shale where the lateral will probably focus, that is also shown there.

If we pan to the right of this exhibit and look at the details of the vertical pilot hole, we see, in a little inset, an enlarged section there shown on the exhibit, and it shows that cores will be taken through the Tuscaloosa Marine Shale target portion, so those cores will be taken to the surface where they can be

analyzed. There will be a number of well logs run, different types of well logs, to better define the petrophysical parameters of the Tuscaloosa Marine Shale target, and there will be also an effort made to take fluid samples and verify the pressures involved.

So, with this information, they will first make a quick look and decide whether to set the intermediate casing or plug and abandon the well at that point, or if the data looks promising enough to complete the data analysis over the next two or three months, what they would do would be then to run the 9-5/8" intermediate casing. And they would build the angle slightly, building it at eight degrees per 100' to 15-degree inclination, and being 50' into the Eagle Ford formation, which is a very competent shale. So then they would be set up that, if they so decide after analyzing the data, they could then proceed with the lateral.

Q All right. So, if I'm understanding you though, the results from drilling the vertical well have to be promising or else the well is just plugged, there is no lateral drilled, there is no hydraulic fracturing that occurs; is that correct?

A That is correct.

Q All right. I mean, Helis is, of course, hoping

-- although it's 40 miles away from the nearest TMS well, it's hoping that it's going to be successful.

So let's go over, in the event that they do get promising results, how that lateral would be drilled and completed.

A The next slide shows the -- or exhibit shows the vertical hole section on the left down to where the well would be turned horizontal and the lateral would be started. So we see the vertical well -- portion of the well, along with the heel of the lateral on the left side of this exhibit.

The right side of the exhibit is an enlargement showing more details about the lateral and how it would be drilled, the casing program and so forth, mud program that would be used.

If we focus on -- at the upper part of the left side of the exhibit, the vertical hole section, we see more detail on how the aquifer will be protected. We can see that -- you will have three different casing strings, concentric, one inside the other, each about 1/2" thick wall, steel wall, casing, so that's -- will afford quite a bit of protection. And we see also that there will be two cement sheaths that will be -- that the steel casing will be grouted in place, both the surface pipe and the intermediate pipe all the way

back to the surface. So that gives us some of the details of at least how the lateral would be drilled, if the decision was so made.

Q All right. Is it correct to say, Dr. Bourgoyne, that any hydraulic fracturing done in connection with completion of the test well would only be for a short period of time and it would be completely confined to the TMS interval, which, as we've indicated before, is like two miles below the surface and 1.8 miles below the deepest freshwater aquifer; is that correct?

A That's correct, and the fractured sections are expected to be in 25 different stages, and the detail of this is shown in the G-3 exhibit that Bill Dale had covered previously, and the fractures are represented, more or less, to scale. In fact, that entire exhibit is to scale, except that the wellbore couldn't be drawn to scale because it would be so thin you couldn't see it, but other than that, that exhibit is to scale, and the fractures are shown approximately to scale, also, so they're confined to the Tuscaloosa Marine Shale interval.

Q All right. You've got quite a few additional exhibits. We're trying to be as quickly -- to move through our presentation as quickly as we can, so I'm not going to ask you to comment on each individual

slide or exhibit, but that information will be submitted for the record. You're prepared for a cross-examination should people have questions about the details that are reflected on these exhibits, but I guess right now then I would just ask you to skip to your concluding exhibit about what conclusions have you drawn as a result of your study of Helis's plans?

A I have concluded that, indeed, Helis has met the permit requirements of 29-B. Helis has operated in Louisiana for over 80 years. The well plan is based on safe, time-tested drilling practices and best available technology for protecting the environment. Helis's well planning and their H-INC Contractor Audit Safety and Environmental Management System, sometimes abbreviated SEMS, is designed to meet or exceed requirements for federal leases, in that, they drill in many states, and these also meet or exceed the requirements in Louisiana. Helis has considerable drilling experience and has drilled similar shale prospects in the United States and in -- both onshore and offshore within Louisiana, although not horizontal wells.

Q All right. And, of course, you're not an economist, et cetera, but do you see that some benefits could result from Helis's operations, at

least should the well be successfully completed?
A Yes. I think it would -- it can have significant economic impact. It will be a very expensive well to drill. Obviously, if it's successful, there will be royalties and so forth that will be paid. The State will get severance taxes and it will be property taxes and so forth associated with the operations. So, yes, I would think the economic impact could be considerable, and I think this Tuscaloosa Marine Shale and hydraulic fracturing does offer the possible advantage of the second crop of oil for Louisiana --
Q All right.
A -- that would definitely have a big impact for the state.
Q From a drilling and completion standpoint, what, if any, alternatives do you see to provide more protection to the environment?
A Not any that I can see. I think that the plan uses the best available and safest technology, and has taken into account the various concerns.
Q All right. So, in conclusion, based on your careful and thorough review of Helis's plans, given all the relevant facts and circumstances, is it your expert opinion that Helis has chosen an optimum site and minimized environmental impacts to the extent

reasonably possible in a responsible and prudent fashion?

A Yes.

MR. REVELS:

All right. That concludes his direct testimony.

We will turn now to our final witness, Mr. John Conner.

Mr. Conner has also previously qualified and testified before the Office of Conservation as an expert in environmental engineering.

Mr. Conner, if would you state your name for the record, and then briefly summarize your education and work experience that have qualified you to testify as an expert in environmental engineering?

MR. CONNER:

Can you hear me, can you hear me back over there?

AUDIENCE MEMBERS:

No. It's not on.

MR. CONNER:

This is not on. Okay. We got it.

I'm going to stand over here by these slides for those questions.

Can you all hear me?

AUDIENCE MEMBERS:

(Inaudible.)

MR. CONNER:

Okay. I'm going to hold it very close.

AUDIENCE MEMBER:

I can't hear you.

MR. CONNER:

I'll get here by these -- like that? Is it working now? It's working, okay.

I'm going to stand over here by these slides in order to answer your questions about the -- is it working -- my qualifications.

I got my degree in civil engineering from Stanford University. I have worked for -- it's not going to work?

AUDIENCE MEMBERS:

(Inaudible.)

MR. CONNER:

Is this working now, is that working, can you hear it? Move around with it?

All right. I'm going to talk -- go Titans.

(Applause.)

Okay. I'm going to stand here with this mic and talk about my slides.

MR. CONNER:

So, starting over, my name is John Conner. I'm a

professional engineer, professional geoscientist, recently got a degree -- my degree is at Stanford University a long time ago, and for 34 years I have been working as an environmental engineer in the -- principally in the oil and gas business. I have worked all over the U.S. I've worked all over Canada, Latin America, and the Middle East, specifically working on environmental problems associated with oil and gas, and they do happen, and my job has been to prevent those problems and deal with them when they happen.

I've worked for USEPA. I've work for the state regulators around the country, I've worked with other regulatory governments, and I've worked for a lot of oil companies, and that's the basis upon which I will be talking to you all today.

MR. REVELS:

I would ask that Mr. Conner's qualifications as an expert again be recognized.

MR. HENRY:

Mr. Conner's qualifications have been recognized.

Whereupon,

JOHN CONNER

was called as a witness on behalf of HELIS OIL AND GAS COMPANY, and, after having been first duly sworn, was

examined and testified as follows:

DIRECT EXAMINATION OF JOHN CONNER

BY MR. REVELS:

Q Mr. Conner, were the exhibits that you are about to discuss prepared by you or under your direct supervision?

A Yes.

Q All right. If you would go through your first issues which you've considered and the materials that you've reviewed in connection with this hearing in order to form your opinion?

A Yes. My area here has been the environmental engineering aspects of this project. I've worked on a lot of these projects, and I am a firm believer that hydraulic fracturing can be done safely in a way that protects the environment, but you've got to do it right. You've got to do it right.

And so the question is, is -- are the procedures in place to achieve safe and effective hydraulic fracturing of this unit on the Helis site, and to do that, to make that evaluation, we have looked at several different specific topics that are the same as have been expressed as a point of concern by a lot of the citizens of St. Tammany Parish.

AUDIENCE MEMBER:

Liar.

A Did you say louder?

(Laughter.)

Oh, I thought you said "Titans, Titans."

Okay. So the first is considerations for the site selection. Is this site, has it been carefully selected, is it appropriate to minimize the impacts?

The second is, are procedures in place to protect the groundwater?

The third is, what about water use? Fracing can use a lot of water. Where is it going to come from, and is it appropriate?

Third (sic) is, what procedures are in place and what physical structures are in place for spill prevention and storm water management, how do you keep this stuff where it is supposed to be and not where it's not supposed to be?

And the ecology and wetlands, there are issues in this area for threatening endangered species. Have those been taken into consideration, will they be protected?

Finally, the air monitoring, there will be an air monitoring program. What is that going to consist of? There is an emergency response program in place. Will it be effective?

And, finally, we also looked at miscellaneous issues, like noise and traffic.

For each of these areas, we have gone through all the records of Helis's operations here in Louisiana. We looked at Helis's operations in other states. We looked at the plans that are in place today and the plans for the future and measured those against a specific standard to see if they are up to snuff.

These are the standards, these are the criteria, this is the yardstick that we've used for that. We've taken all those records, including interviews with Helis's personnel, records of the DNR on violations or insufficiencies that are in the files, and measured them against these criteria.

First, the Louisiana laws and regulations that govern oil and gas and environmental, they are in Title 43 and Title 33 of the Louisiana Administrative Code. Secondly, the Code of Federal Regulations of the federal government, those are in Titles 29, 33, and 40. They govern wetlands, they govern oil and gas, they govern water protection. And then we've also looked at industry guides, industry standards, that are in place to say what is a good operation, what is not a good operation. This has got to be a good operation. It's got to meet these standards. So

those are the yardsticks, and that's what we've done, Mr. Revels.

BY MR. REVELS:

Q All right. Let's just start off now with your next slide, and if you would review Helis's operational history, and could you briefly summarize that history and any opinions you have formed as to the ability and competency of Helis as an operator?

A Okay. Helis has drilled over 650 wells in the U.S. Most of those wells are -- well, all of the wells are in the states that you see here that are in orange. They extend from their home state of Louisiana, up to Montana.

Helis was founded here in New Orleans 80 years ago, and most of their wells are here. There are over 100 wells that are actively operated by Helis in Louisiana today.

Going through the records on these, since 2006, there have been over 900 inspections of Helis facilities by the Department of Natural Resources where the inspectors come and look at the facility, inspect it for any -- to ensure that it's meeting the criteria that the government has set forth for safe operations. We went all those inspection records. We went through all the records on the DNR files, which

you also can do yourselves, to look to see if there were any irregularities today in their operations. There aren't any. Today, Helis is completely compliant. There are no outstanding orders or deficiencies.

In the whole record of the years that we looked, we found 11 citations, five of those were compliance orders, five of those were called red flags. We looked at each one of those to see if they have been resolved. They had been resolved. Most of those were paperwork issues. None of those 11 citations in all those years involved an environmental impact.

So, based on our experience and our evaluation, Helis is -- has a good operation. They are not perfect. They're a very good operation, and that is the result of my evaluation of that.

There is one other thing, Mr. Revels, to point out is, there is -- there is a -- I saw on St. Tammany Parish webpage a concern about an SPCC plan. What that is, is a spill control, prevention, and countermeasure plan, and that is a specific plan that is in place, so how do you prevent there from being spills? If there are spills, how do you control them?

The USEPA, in February of 2013, cited Helis saying that the plans for one of their facilities in

the Atchafalaya Basin was insufficient, and they laid out ten things that were insufficient or had to be fixed. They inspected the Helis facilities and found no problems with the facilities. There were no spills, there were no accidents, but they didn't like the way that plan was written. In fact, eight of the ten things that were on the plan were already in the plan. There was one thing that had to be corrected, and it was corrected. So that is one issue that was also in the record that we evaluated to see if that was -- comported with good operations and any insufficiencies there have been resolved.

Q All right. Of course, we said before that, should the results from the vertical hole be favorable, Helis does plan to drill a horizontal lateral and complete it using hydraulic fracturing, and this process is quite concerning to some members of the public. So I'd ask that you go through the process, explain how it works, and why you believe Helis will be able to safely complete the well without endangering the aquifer?

A Okay. I think most of the folks in here have some familiarity of what this process is of hydraulic fracturing, and Dr. Bourgoyne has talked about it on a fairly sophisticated level, and I'm going to talk

about it at a fairly simple level from the environmental prospective.

So here is a diagram I've got on this slide. I don't know if you all can see this or not. It's pretty small. I've got a cross-section here. It's like a slice through a piece of cake, all right. If you are looking, here is the surface up here of the earth, and there's a big slice going down, and I can show on here some of the dimensions.

There is a drilling well up there. I'll get this fancy laser pointer here, and I can check it out. All right.

Here's the drilling rig, and down at 3,400' is the base of freshwater. So, if you go where we are right here, and you drill down to 3,400', you can still get fresh water. It's one of the deepest freshwater areas in the state by far. It's a lot of fresh water right here (indicating). When you get below fresh -- you get below 3,400', it's saltwater. It's naturally salty. Above that, you can get fresh water, and it's good water.

Helis will be drilling -- I'll talk more about this. I think Dr. Bourgoyne did, but we've got to put a casing in there 4,000' deep to seal off any contact with that freshwater zone. Once that is in, they will

drill down and do a horizontal well, that is a well that will go down 12,000' and then bend very slowly and go horizontally for a mile or so.

Then what happens there is a three-step process, and I'm going to go through it pretty quickly. We're going to talk about what controls are in place to meet what I care about is protecting water. What happens in this process, and how do you do it right to make sure you don't screw things up?

So, first is, a steel casing is put in the ground and cemented in place, and then it's perforated. There are chargers that are taken down there in a short section at a time, a couple hundred feet at a time, it's perforated so that water can go out through there, put holes in that pipe. Then a special high-pressure truck comes to the site and it pushes water down there under very high pressure. The shale is very much like a dried up lasagna, with all these inner-bedded layers that have been squished down. When you push water in it, you can pop those layers open. If you can open those layers up, oil and gas can come out, so -- can you hear me?

AUDIENCE MEMBER:

(Inaudible.)

A All right. I'm getting to that part. You've got

it.

Okay. So that pressure -- that water pressure is put in there, and these fractures will open up. These fractures are at most about a quarter of an inch thick. They're not big, and once those fractures are opened up, sand is then placed in there and then the pressure is taken off and the fracture can't close again because it has sand in it. All right. So, if you put -- if you open up a book and you spread sand in those pages, you try to close that book, that book won't close up again, right. It's got sand in between the leaves. So now that they're sand in there, the oil and gas could come out, and that when you -- so the fractures close up, the sand stays back, and then the gas comes out.

There are a number of things you've got to do while you're doing this to do it safely. You're doing short sections called stages. You monitor your pressure during that entire time so you can tell how far your fracture is going. These -- this system is designed to frac no more than 100' above or below this unit, and there is very specific controls on that to make sure that that is under control, okay.

BY MR. REVELS:

Q All right. Our next question is, depending on

the length of the lateral and the number of frac stages, Helis may use a considerable amount of water in connection with completion of a horizontal lateral. If you would discuss the water volumes that may be used and where that water will be sourced?

A Okay. Hydraulic fractured wells are horizontal wells, and they're a lot longer than normal wells, so because they're so much longer, they use a lot more water. They use somewhere, you know, five to ten times more water than a normal vertical well. So where is this water going to come from? The well -- this well will use on the order of five million gallons of water, if it actually is completed out in this horizontal section. So where is that water going to come from?

The Louisiana Department of Natural Resources and the Louisiana Department of Environmental Quality advised drillers, don't use our groundwater. There is a lot of people already using the groundwater, use surface water.

In this area, in St. Tammany Parish, there are -- St. Tammany Parish is one of the leading parishes in the state for scenic bayous. There is some beautiful waters in this county (sic). Those will not be used and neither will be the groundwater be used. So, for

this case, Helis will be using private pond water. There won't be any water taken from any scenic bayou. There won't be any water taken from any water wells.

Q All right. One of the concerns expressed about hydraulic fracturing relates to chemical constituents used and the inability of the public to obtain adequate disclosure of these materials. Please discuss how Helis plans to handle these matters.

A Okay. I think the big question is -- I just said they would use five million gallons of water, and the real question I don't think is the concern of people is not that we're using water, it's that we're using chemicals in the water, right?

So this is how it normally works. When the frac trucks come up, and there is a lot of them, and they bring that water in, they are using a number of different machines that will swirl that water together like a blender with stain out, and that sand-water mixture gets put down the hole. To keep that sand suspended in the water, it requires different -- different chemicals are used for that, and so the total mixture that goes down there is 90 percent water, 9.5 percent sand, and 1/2 percent chemicals, but the big question is, what is in that little jar of chemicals, right.

So the chemicals that are in there are a pretty long list. Like a really excellent source of information about that is called FracFocus. It's a webpage that was established by the Groundwater Protection Council. It's a consortium of different state agencies, including Louisiana. They put together this webpage that has all kinds of information about how fracturing is done, what chemicals are used, why those chemicals are used, and are they dangerous.

If you'll look down that list of chemicals, most of the chemicals are totally innocuous. You could eat them, you could drink them, but they're not all like that. Some of them are hazardous, right. Some of the chemicals that are used are not innocuous, and if they're not used properly, they're dangerous. So that's why in this business, as in any other business, you've got to do your business right. You've got to handle your materials right, that's -- these same chemicals are used in a lot of other businesses, but they have to be handled safely.

What Helis will do in this regard is, they will follow the requirements of Louisiana 29-B, Section 118, which sets forth what's called chemical disclosure requirements. For that purpose, Helis will

meet the requirement of 29-B by putting all of the information of the chemicals that they use, what are those chemicals, how much was used, what percentage is this, what's their chemical ID number, that will be put on the FracFocus webpage with a direct link to the public access.

Then, in addition, Helis has a policy to go beyond what is normally done. There has been a lot of -- I don't know if you all have heard the frustration in the public about, okay, you've told us about your chemicals, you've posted them, but then you said they were trade secretive, okay. It's frustrating. Helis's policy is for a full disclosure, and they will work with their contractors to make sure that there are no trade secrets. If we're going to put the chemicals there, we will tell you what those chemicals are, and that's the procedure that will be followed in this instance.

Q So that information would be freely and publicly available after a completion is made; is that correct?

A Yes, that's right. All that data will be publicly available.

Q All right.

MR. HENRY:

Now, again, I'm going to ask everybody if

they could keep their outbursts --

BY MR. REVELS:

Q All right. Your next series of exhibits relate to the number and location of water wells in the area, if you would discuss it?

A That's right. We've looked really closely at where the water wells are, and certainly, in terms of environmental protection, probably the first point of interest is the water wells. There are a lot of water well users in St. Tammany Parish. In this particular area, we have 122 wells in the community of Mandeville over to the east here -- the west. I'm sorry. I got it backwards. And we have -- right where we are here at the Lakeshore High School, there are two wells. One of the deepest wells in the county (sic) is 1,200' right where we're standing.

So, if we look at the distances out, there aren't any wells within a half mile, there aren't any wells within a mile, but at a mile and a half to two miles, we start picking up some wells, that's a long ways away. Obviously, it's still important to be protective of those wells.

An important feature of this -- I don't know if you all can see this -- is this big blue arrow line here. Another thing we're really concerned about is,

which way is the water moving. So the water in the aquifers under this site is moving very slowly down towards the Gulf, and it moves in a south-southwest direction, so that means it's not moving in the direction of Mandeville. It's not moving in the direction of the high school. It's actually moving in the other direction.

AUDIENCE MEMBER:

(Inaudible.)

A You guys aren't digging this animation here or what?

So what I'm going to do now is kind of show this in a 3-D perspective, because I think it's important, not only to understand just how far away we are on the -- as the crow flies, but how deep it is.

AUDIENCE MEMBER:

It's hard to see.

A Yes, it's kind of hard to see. I'm sure.

So I'm going to zoom in on this. There is a cross-section here. This is where the freshwater is. This is where Helis's well will be, and there is a casing down to 4,000'. Let's zoom in on that one. We can see a little bit better, not great because this is -- it's a big gym and a tiny screen.

For those of you all that can see this, I'm

trying to show where the wells are with respect to Helis's well, and here we are at the high school, that's the deepest well in the area at 1,200', that's pulling from the Evangeline Aquifer. Helis's well is here in the middle. It has solid casing down to 4,000'. And then, in Mandeville, there are wells encountered at two different depths. There is a lot of wells that are around 250' deep, and then there is a bunch of more wells around 500' deep.

Our plan is -- I'm jumping ahead on this a little bit, but our plan is to put in -- can you go back for a second here? There will be monitoring wells put right on the site at depths that will line up with these different wells, and I'll talk about that more in a minute.

So this slide, which you also might not be able to see, sums up all that information about those wells. We've counted every well in the area and how deep it is.

So, here again, we have the Helis well which is cased solid down to -- let me see if I can do this right -- down to 4,000'. There are 64 water wells within two miles that extend to about 530'. There are 48 wells at -- they go down to 250' within two miles, and none of those were within a mile. The high school

well here, this is the one public water supply well here, it goes down to 1,200'.

This blue area that we're talking about is -- I think you all are familiar with the Southern Hills Aquifer system. The Southern Hills Aquifer system is a system. It's a system of on the order of 12 different aquifers that are stacked up on top of each other. There is the Chicot Aquifer, which is broken into the Upland Terrace and the Upper Ponchatoula, that's where most of the residential wells are. They get good water out of that. There is the Evangeline-Equivalent Aquifer, which actually is four other -- five other aquifers all separated by plays. So, even though it looks like it's all blue here, it's actually sort of like a stack of pancakes where you have sand and play, sand and play, sand and play, and different aquifer units that make up this very large system. On the Jasper, there's four more aquifers. The separation isn't perfect, but it's perfect enough that you can get water out of some and not out of others. So that's the system that has to be protected, so --

BY MR. REVELS:

Q All right. You now have a series of exhibits that demonstrate the unlikelihood of any contamination

posed by hydraulic fracturing to underground sources of drinking water, if you would discuss those?

A Yes. There are a couple of -- there are a number of concerns that people have about hydraulic fracturing. I think that you all are those -- you all are aware of those, and there is one that I want to talk about that doesn't happen before I talk about one that does happen.

The one that doesn't happen is uncontrolled fracture propagation. Here again is my diagram of an idealized well. Here I've got the casing coming down through freshwater, down through about 9,000' deeper until it gets into the Tuscaloosa Marine Shale, and here I've idealized that there's a house on top of this, which there isn't but I'm saying there is. So the concern that a lot of folks have is that I'll start fracturing and the fracture will go so far that it will connect this marine shale, and all the chemicals I put in there will come up and get into one of these aquifers or get into somebody's well, that is a concern that many people have about hydraulic fracturing. That absolutely can't happen here, and I'll tell you why it can't happen here.

It can't happen, first of all, because it takes tremendous amount of energy to split a rock under

water. You pump up a bicycle tire, right, not that easy to do, yet you're using air pressure just to fill a tire. If I'm using water pressure to split a rock, it's a tremendous amount of energy, and as much energy as companies have been able to use and as much as effort as they make, it's hard to get that fracture to go 100'. It's really hard to get it to go past 300', and it's impossible to get it to go 9,000'. It's just not physically possible.

And there's another reason. The second reason is that, as that fracture -- if that fracture comes up and it encounters a sand unit, it's all over. It's like rain into a gutter. The fracture can't go through a sand, and there are many, many sand layers. So this particular issue is not an issue in St. Tammany Parish.

AUDIENCE MEMBER:

(Inaudible.)

A There's another issue -- that is an issue, and we're going to talk about that now. Let's go ahead.

So the issue is that, when you have a problem with a hydraulically-fractured well, the problem has been the casing and cementing on that well. There have been cases where it wasn't done well. It's very rare. In Pennsylvania, the DEP did a survey and found

that zero -- it only happens 0.25 percent of the time, so 99 percent of the time you don't have that problem.

So what do you do to avoid that problem?

AUDIENCE MEMBER:

(Inaudible.)

A Okay. So what measures do you take to make sure you protect the water and that the well integrity or a casing problem doesn't happen?

Well, this is how you do it. This is how Helis will build its well. First, there will be a conductor pipe put in to 120'. This is a big diameter pipe that is pushed into the ground to stabilize the ground. Then, inside of that, they will drill a surface casing down to 4,000', that's all the way through the groundwater zone. Then that casing will be cemented in place 100 percent up to the top, and that cement is pressure tested to make sure there are no holes or failures in there. It's tight. If it's not tight, it's repaired with what is called a squeeze job. Then, from there, an intermediate casing goes all the way down to 12,260', that intermediate casing is then cemented all the way to the surface. Then that intermediate casing is pressure tested to make sure there is no faults or leaks in there. Then it will also -- it's tested with what is called a cement bond

log to make sure that cement is tight. It's like a sonar signal. After that, if the well is successful and if it's a viably -- economically viable, a horizontal section will be put in, and then it will be cemented up inside the production casing.

The purpose of this is to provide a triple barrier between what is in the Tuscaloosa Marine Shale and what is inside the well and in the water out here, so you would have to have three barriers that fail. First, the production casing would have to leak. Then the seal around that would have to fail. Then the intermediate casing would have to fail. Then the concrete seal around the intermediate casing would have to fail. Then the surface casing would have to fail, and the concrete seal around the surface casing would have to fail. That is the safest way you can build a well, and that's why -- Helis has chosen to build it like this. There have been other wells in the country that had problems, but they weren't built like this.

AUDIENCE MEMBER:

(Inaudible.)

BY MR. REVELS:

Q All right. You have demonstrated that the proposed -- hydraulic fracturing poses little or no

risk to the aquifer, but what --

AUDIENCE MEMBER:

(Inaudible.)

BY MR. REVELS:

Q -- but what steps is Helis taking to corroborate this?

A Okay. Well, the question is that they have plans in place to make sure they build this right. Well, how do you know it's built right? You've got to check it. You've got to monitor it.

In the state of Louisiana, there are not presently requirements to do this monitoring. Helis works a lot of other states, and they do this monitoring as part of their operations. It's a good practice.

So the first thing they're going to monitor is the groundwater. They're also going to monitor the air. They're also going to monitor the storm water, and they're also going to monitor the noise. All those things will be monitored before, during, and after.

Now, I'm going to talk about groundwater first. I told you before that there were 122 wells out to the west, and Lakeshore High School up here to the north. The states that require groundwater monitoring require

it within a half-mile radius. Helis's plan is to go out to two miles, that's where folks live, that is where folks are concerned. So this radius of monitoring will go out two miles away, it will include the high school, it will include the residential area over here.

In that area, there will be two types of monitoring for groundwater. First, there will be wells from this group that will be monitored -- actually, household wells and the high school well, of course, will be sampled before any drilling is done, they will be sampled during, they will be sampled periodically after to see there's any effect. They are pretty far away, so it will be a second level of monitoring that is done inside that area.

And this is a little zoom in for those of you all that can see that of the pad itself. And on the drill site itself, which is about a three-acre area, there will be three clusters of monitoring wells. There will be a cluster on the north side, this is the direction of the high school; on the west side, this is in the direction of the community; and on the south side in the direction of Lake Ponchartrain. There will be wells specifically screened (phonetic) to be at the same depth horizon as those household nearby

wells. So, if there were anything to escape this site, it would be detected long before it could create a problem. Certainly, it's certainly not expected. The well is being built in a way that -- where it wouldn't happen, but it's important to test and verify.

Q And, Mr. Conner, who will do the testing and with whom will those results be shared?

A Helis's plans call for contracting with a professional environmental engineering company, a consulting company, and a certified laboratory in the state of Louisiana to conduct that sampling and testing, and my understanding is that information will be shared with the community on all these monitoring programs, the air monitoring data, the groundwater monitoring data, the storm water monitoring data, and the noise information will be made publicly available.

Q All right. Now, I'm assuming all this monitoring and testing is quite expensive; is that correct?

A It's -- yes, it's quite expensive.

Q And is it required by any of the existing regulations?

A It's not required in Louisiana, no. The groundwater monitoring is required in some states, but the air monitoring, the storm water monitoring, and the

noise monitoring aren't required anywhere in my experience, but all four types of those monitoring will be conducted for this project.

Q And does this represent just one more example of Helis attempting to go above and beyond the existing or minimum requirements?

A This is an example, yes.

Q All right. Your next couple of exhibits relate to storm water, if you would discuss those?

A Yes. One of the other areas of monitoring that I mentioned was storm water monitoring. This really reflects that, if you were to spill something on the site, where would it go? Will it -- how will it be contained? If you spill something in your kitchen, where does it go? Well, this is an oil site. If we have an oil spill, how do we control that? We're in the middle of a wetlands.

This is the site. I'll zoom in here, and now this white area you see is the actual pad area. It will be a graveled area with board mat placed on top of it. It's -- everything that Helis will do will be within that area. Everything they do is in that area. In that area will be a number of engineering features to control and prevent spills.

So the first is, there will be a rainwater

holding pond built 50' by 50'. It's a small pond up in the northwest corner, and then drainage ditches will be built around the perimeter of the site such that any rainwater or any spill on the site goes right to that pond. Then, in addition, there will be dikes built all the way around the pond -- or around the site. What is a dike? A dike is like a --

AUDIENCE SPEAKER:

What's it lined with?

AUDIENCE SPEAKER:

Nothing but plastic.

A They are plastic lined so that -- they're built with soil and you drape them with plastic to make them impermeable, so that -- and they look like a small levee, you know, just a few feet tall. So any spills inside that area are contained. It's a very important environmental feature. It's a very important safety feature. If there were -- in spite of all the safety measures put in place, if there were a fire or any type of accident, this system serves to contain that, and that's important.

BY MR. REVELS:

Q All right.

A And, finally, when that rainwater comes to this pond, it will be monitored there. It's going to be

sampled and tested according to the approved government plan, and if there's anything in that water, it will be filtered and treated before it's discharged, that's good operating practice.

Q All right. There will be some waste products that are produced in conjunction with oil and gas. What sort of waste products are we talking about, and how will they be disposed?

A There is two types of principal waste products that are associated with a drilling operation. First, is dirt. You're going to drill a hole into the ground. The target is 13,000'. It's a lot of -- you're going to dig a lot of dirt out of the ground, so that dirt which is called cuttings and the mud that is mixed with, the drilling mud, those two items are solid material. They will need to -- they will be containerized and hauled to an offsite disposal facility outside of Tammany Parish -- St. Tammany Parish. There is a lot of those in this area, and that will be determined what is the most appropriate.

In addition, there is water. After the fracturing is done, some of that water comes back out of the hole. It's salty. It needs to be -- it will be contained, and it also will be hauled out of this parish to be disposed in an injection well.

Q So Helis is drilling with a closed-loop system, and all of their produced fluids, the produced solids, are all transported to a commercial waste facility, and you can see from that slide that none of those facilities are located within St. Tammany Parish; is that correct?
A That's correct, yes. And that's an important feature, what I think Dr. Bourgoyne talked about, it's a closed-loop drilling system. There are no big mud ponds. There are no big saltwater ponds here. In fact, there aren't any. It will all be containerized in tanks. It all goes off the property. There will be no mud pits left here. There will be no waste left on this site, that's why the footprint of the site is so small.
Q All right. Your next exhibit relates to considerations that went into selecting the drill site location, if you would discuss it?
A Well, I think a big issue about this site is that it is in a jurisdictional wetlands. This area -- a lot of the area around here, you know, where we stand today is tree farms, and the tree farms have been around so long that they're not subject to the Clean Water Act Section 404, which is the wetlands act, but when Helis comes in here or anybody else comes into

these areas, they are subject to those regulations.

Those regulations require that any type of footprint that you make out here has a minimum impact on the ecosystem, and there are a number of steps that Helis has gone through with its consultants to figure out how to do that.

So the first is, if -- we used infrared aerial photography and LIDAR our maps to map out very carefully where the wetlands are in the orange, and it picked an area out here to try to minimize the amount of wetlands that would be affected by this pad. They also made the pad, working with the Corps of Engineers, really small.

Secondly, we're using an existing roads. We're not building new -- making any new roads through a wetlands area, that's consistent with the API Guidelines HF 3.

They also wanted to get as far away as they could from local communities, be outside the Coastal Zone, and still hit their target geological formation. So that -- balancing all those different controls and objectives is why the site is where it is.

These applications were reviewed by several different agencies. They're still reviewing them today. The Louisiana Department of Environmental

Quality, U.S. Army Corps of Engineers, Louisiana Wildlife and Fisheries, USEPA, and Louisiana Geologic Survey confirmed that there were no less damaging areas that could be used for producing this oil and gas.

AUDIENCE MEMBER:

This feels like a filibuster. When do we get to speak?

BY MR. REVELS:

Q And one follow-up question on site selection. It's a proposed unit well, so, clearly, now that a unit has been formed, the location needs to be at a legal location inside the subject unit; is that correct?

A The well must be inside the dotted-white line, yes.

Q All right. The next topic, our opponents are, of course, concerned about possible detrimental environmental effects associated with the planned benefits.

One potential area of concern is the effect on endangered species, if you would discuss your next exhibit?

A Right. There are four endangered species in St. Tammany Parish area, in general. There's the bald

eagle, there's the manatee, there's the red-cockaded woodpecker, and there's the dusky gopher frog. This frog is part of the evaluation. This is part of the --

MS. JORDAN:

I'm going to object to him testifying about endangered species. I didn't hear any expertise on that matter, so I'm going to object to it.

AUDIENCE MEMBER:

(Inaudible.)

MR. HENRY:

All right. We're going to take that objection under advisement, but it's duly noted.

MR. REVELS:

We're almost through.

MS. JORDAN:

So you're going to let him testify about endangered species?

MR. HENRY:

I am going to let him testify, and it is going to go to the weight.

MS. JORDAN:

So it's denied. I just want to put on the record that it's denied, because, again, taking it under advisement and then letting him talk

about it is denying it, so it can just be clear for the record.

MR. HENRY:

It is not denied. It's taken under advisement.

MS. JORDAN:

So he's going to move on to another topic then, or finish -- or finish?

(No response.)

Okay. Thank you.

BY MR. REVELS:

Q Go ahead.

A The biologists on my staff have reviewed all those records regarding these frogs, including the surveys that have been completed by the Nature Conservancy and the U.S. Fish and Wildlife.

The dusky gopher frog was last seen in this area in 1967. Today, there are a population of 250 of these frogs that live in three ponds in Mississippi. Those ponds are over 60 miles away. However, the U.S. Federal Court determined that some of the property in St. Tammany Parish could serve as what is called critical habitat for those frogs if they were to be reintroduced.

So there's critical habitat area number one,

which is one of 12 that the U.S. Fish and Wildlife has designated, is located in St. Tammany Parish about ten miles east of here. It consists of the last pond where that frog was seen in St. Tammany Parish in 1967, plus four other ponds that are nearby that could be a viable habitat. So there are none of these frogs on this property. There will be no drilling in this -- there will be no intersection of this drilling project with this habitat, but it is within the area.

Q All right. This is your last slide. I know everybody is (inaudible).

There are other issues relating to public safety that Helis has taken into account, if you would briefly summarize those?

A Yes. We've talked about some of these issues. We haven't talked about all of them. I've checked these off.

There's air monitoring and emergency response. Noise and traffic I haven't talked about. We have availability of all of those things. We've found that the procedures in place are satisfactory or above average, and I'm prepared to talk about those on cross.

Q Thank you.

In conclusion, Mr. Conner, in your expert

opinion, have the proposed operations by Helis been designed in a manner to minimize the environmental impacts and public safety risks to the maximum extent reasonably possible?

A Yes.

MR. REVELS:

That concludes our direct presentation. I tender the witnesses.

MS. JORDAN:

Hello. Testing.

My name is Lisa Jordan. I represent the Town of Abita Springs.

I want to start by offering an introduction, a student-attorney form for Ms. Caroline Wick that is required for the records so that she can represent the Town of Abita Springs.

MR. HENRY:

Sure.

MS. JORDAN:

I'm going to try to be brief because people are leaving, and they came here to speak and that's a big reason why we asked for this hearing.

I've been asked to ask you all not to applaud.

Okay. I'm also going to be brief, and another thing I want to put on the record is that this packet of information was just presented to us and our expert at the hearing today. So this detailed cross-examination that they think we're going to do is not going to happen because we didn't have the information. We had about six pages of mostly letters, that was everything submitted into the DNR record before today.

So -- okay. I also want to put on the record that we allowed, you know, them to testify. We didn't cross them as to their expertise, and we just want to say that we're not accepting that they're experts and that we just accepted it for purposes of the hearing so it could go quickly, and we're not accepting that, nor are we necessarily accepting the evidence they submitted. For purposes of the hearing, we accept it, but for future proceedings, like court proceedings, we are not agreeing to their expertise or to the authenticity of their documents.

I'm going to start with Mr. Dale. I'll just go in the order that you all went in.

CROSS-EXAMINATION OF BILL DALE

BY MS. JORDAN:
Q I have a few questions for you.
You testified at the unitization hearing that Helis -- when they applied for their unit; is that correct?
A Yes, ma'am, that's correct.
Q Okay. And that's a big part of what you do, right, you testify for different companies for their unitization hearings; is that correct?
A Yes, ma'am.
Q And for the most part, you've worked for industry; is that correct?
A That's correct.
Q Have you ever testified against an oil and gas company?
A Yes. I've opposed -- I've had opposing sides at Conservation hearings before, yes.
Q You've testified for the public before?
A Yes, I have, yes, ma'am.
Q When was that?
A I don't have the dates for you. It's part of the public record. You can look it up.
Q I just meant like a name, an example of a name, or something like that.
A It's not uncommon for geologists to do the

consulting, but I do -- I represent, not only oil and gas companies, but in some cases, landowners, at the public hearings.

Q Okay. Landowners who oppose the unitization?

A They might be opposed to a company's plan. I'm representing them -- on their behalf in those matters, yes.

Q Okay. And so it's correct, isn't it, that this information that we have here was not presented at the unitization hearing; is that correct?

A I think I stated that one exhibit was. The unit that you see depicted on many of the exhibits was presented there. Some information was.

Q But the vast majority of it was not; is that correct?

A That's correct.

Q Okay. And so is your application before the DNR for a drilling permit complete at this time?

A I'm a geologist. I didn't submit the application. I assume it is so.

Q Is there someone who is a better person to ask that question of?

A Yes. One of these engineers reviewed that application. I think they can answer that.

Q Okay. All right. Moving on -- hang on one

second.

You testified about the other wells in the area; is that correct?

A Yes, ma'am.

Q And none of those wells that you talked about, like the Keller Heirs Well, which is the closest one, that was not a productive well; is that correct?

A That is correct.

Q And it's correct that the Louisiana Geological Survey said that there's maybe a 50/50 shot of you all actually finding oil in this area; isn't that correct?

A I'm not sure about that.

Q You're not familiar with the Louisiana Geological Survey meeting that your colleague talked about?

A I saw their report, but there was no -- there is no other feasible location, besides this one.

Q You did not see the report that said there was a 50/50 chance of finding oil at this location?

A I don't recall. No, ma'am, I don't recall seeing that.

Q Do you disagree with that conclusion?

A No. I think -- no. Do I disagree with the conclusion that there's a 50/50 chance? I think there is actually 100 percent chance that there is oil at this location. Whether it is economical to extract

it, that is another question, but I believe -- if you would refer to the study done by the Basin -- by the Basin Institute Research (sic), they did a paper on the Tuscaloosa Marine Shale and it is oil bearing, and they have a rather broad area that is depicted as included in the Tuscaloosa Marine Shale, which is St. Tammany Parish. So I believe there is oil at this location. Now, whether it's economical to extract it at this oil price and at the cost, you know, I can't answer that, but there is oil there. I would say, yes.

Q You're talking about the Lake Ponchartrain Basin Foundation, is that the institute you were just --

A No. This is the Basin Research Institute --

Q Okay.

A -- that did a study on the Tuscaloosa Marine Shale and about this resource. This was done for a lot of the drilling that was done -- that started, you know, in the Florida parishes in 2011.

They talked about the Tuscaloosa Marine Shale is a resource play. They say it's potentially seven billion barrels of oil present there, and that maybe one day the technology would advance to such a point where it could be extracted commercially, so that's part of --

Q You're talking about the --
A It's a public paper.
Q I'm sorry. I don't want to talk over you. Go ahead and finish.
A It's a public paper, and it states that oil is bearing in the Tuscaloosa Marine Shale throughout the study area, which is -- I would have to refer to the paper and the maps presented there. You can see St. Tammany Parish is included.
Q And that means this particular point, do you think they were saying that this particular spot you want to drill has oil?
A Yes.
Q That's your interpretation?
A Yes. I would say, yes.
Q One hundred percent?
A Yes, ma'am.
Q Okay. So you disagree with the Louisiana Geological Survey's conclusion that there's a 50/50 shot?
A I'm not sure exactly -- 50/50 chance of what?
Q Finding oil.
A I can't comment on that.
Q Okay. I'll move on. One second.
You testified a lot and you had a lot of -- and

correct me if I'm getting the wrong person because it was confusing for me to have three people go and then to have to cross, so I'm not intending to be tricky if I'm not -- if it's not you, tell me it's not you, but I think it was you that had a bunch of slides that you showed that showed like the forests in the area and the development over time. Was that your slides?

A Yes, ma'am.

Q Do you have a degree in forestry?

A No, ma'am. I have looked at a lot of aerial photographs, but I do not have a degree in forestry, no, ma'am.

Q Do you have a degree in engineering?

A No, ma'am.

Q Okay. Or land use planning?

A No, ma'am.

Q Okay. Let's see.

You said that there were 76 wells in the parish that Helis had?

A At least 76 wells in St. Tammany Parish that have penetrated deeper than the base of the Southern Hills Aquifer system.

Q Were those Helis wells or just all together, you're saying?

A That's all together.

Q Okay. And how many of those are fraced wells?
A None.
Q None? Okay.
You testify about the requirements to get a permit, and you talked about one requirement is that you have to be 500' from the nearest was it structure?
A Structure, yes, ma'am.
Q Structure.
What are the other requirements to get a drilling permit from the Department of Natural Resources?
A I didn't testify to any of --
Q Well, I -- okay. Actually, you did. You said, one of the requirements to get a permit is that the structure be 500' away, that was your testimony, right?
A Right.
Q And you're saying now that's the only requirement that you're aware of, you don't have knowledge about the rest of it?
A I'm just saying I didn't testify to any other --
Q Okay. Well -- okay. Do you have knowledge about what the requirements are to get a drilling permit from the Department of Natural Resources?
A Yes, ma'am, in general, yes.
Q Okay. Other than that 500' requirement, other

than that 500' requirement, what are the other requirements to get a permit to drill 13,000' under the -- and through an aquifer? What do you have to show DNR before you can get that permit?

AUDIENCE MEMBER:

(Inaudible).

MR. REVELS:

I just object. I'm happy for her to ask the requirements to getting a permit to Dr. Bourgoyne, that was his direct testimony. The cross-examination is supposed to relate to direct. If she really wants to know that information, let her talk to the witness that testified as to that.

MR. HENRY:

If the witness can answer the question, I'll let him answer, but, if not, would you move on, Ms. Jordan?

BY MS. JORDAN:

Q So what are the requirements -- other than the 500' limit, what are the other requirements that a company has to show to get an oil and gas permit from the Louisiana Department of Natural Resources?

A I would rather defer to the exhibits and the expert's testimony.

Q I'm sorry, sir. You said that you had that knowledge, and so I know what you'd rather do, but you've just been instructed to answer the question if you can. If you don't know and you can't --

MR. HENRY:

Ms. Jordan, it appears he wants to defer to the other witnesses.

MS. JORDAN:

I'm sorry, sir. You said, if he has the knowledge, he can answer. He has the knowledge. I'm asking him. We're trying to move quickly here. He said he has the knowledge, and so he should testify about it. I don't care who he'd rather talk about it. I'm asking him.

A I testified about one exhibit that showed no structures within 500', which is a requirement that Helis must fulfill. The surveyors go out and look, and I testified to that exhibit. So, if you have any questions about my testimony on that exhibit, I'd be happy to answer them.

CROSS-EXAMINATION OF ADAM (TED) BOURGOYNE

BY MS. JORDAN:

Q Okay. Mr. Bourgoyne, are you the person I'm supposed to be asking this of, you're the one that has rehearsed this testimony?

A I did testify about the requirements of a drilling permit, yes.
Q Thank you.
My colleague was going to do your cross-examination which is why I don't -- really didn't want to do this, but I want to move quickly.
So what are the other requirements?
A Well, it's laid out fairly clearly in both Louisiana Revised Statute 30:28 and in Conservation Order 29-B, Section 103.
Primarily, you have to pay the appropriate fees. You have to provide the location plat as specified and certified by a surveyor or engineer showing structures within 500'. You have to follow the regulation regarding a 30-day re-entry notice, and fill out an affidavit to the effect that those have been submitted, and that completes your application. You know, along with the check, you send it in, and DNR -- or Office of Conservation has to process the permit.
Q I'm sorry. Say that last part again. I talked over you. I'm sorry.
A You send it in and the Office of Conservation processes the permit. Either it issues it or it denies it.
You know, there is financial requirements also

associated depending upon, you know, how long the operator has been operating in Louisiana, and what their financial wherewithal are, and what their record of compliance has been while operating within the state.

Q Okay. So, other than the paying your money, doing a little map that you call a location plat, making sure anybody within 500' has been notified and having a hearing if they have, and maybe some financial security requirements which we're not sure the details of, that's all you have to do to get a permit to drill through a sole-source drinking water aquifer?

A That is all that is required to submit a permit. The Commissioner of Conservation has the authority, as I understand it, the sole authority, within the state to either issue or deny the permit.

Q Okay. So that's what -- and that's what it's based on, the things that you just told me?

A Yes.

Q Okay. And so all of these things that -- well, I'm not going to ask you this, so let me move on. I'm sorry. Let's see.

CROSS-EXAMINATION OF BILL DALE

BY MS. JORDAN:

Q And back to Mr. Dale again, just a few more questions.

You've had a lot of experience with drilling permit applications; is that correct?

A No, ma'am.

Q You have not? Okay.

How many have you handled?

A I don't submit drilling applications. I'm not an engineer. I'm a geologist.

Q So --

A It's not in my area of expertise, that's not what I specialize in.

Q So what have you done then, what is your -- I notice your qualifications were accepted pretty quickly. They obviously know you here. So what do they know you from? You've obviously been before them many times, the DNR I'm talking about? What is your experience, if it's not drilling permit applications?

A Well, I've also done oil and gas exploration, whereas, an independent geologist I study well logs, map -- make cross-sections, isopach maps, whatever, in search of pockets of oil and gas that have not yet been produced, market that to industry, so oil and gas exploration, as well as being an expert witness.

Q So you don't have a whole lot of knowledge you're

saying about the permit application process to the DNR. You haven't been involved in any of those, is that what you're saying?

A That is an engineering thing. I'm not an engineer.

Q So is it yes or no? I just want a yes or no.

A No.

Q Okay. Thank you.

MS. JORDAN:

Can everybody hear me or no?

AUDIENCE MEMBERS:

Yes.

CROSS-EXAMINATION OF ADAM (TED) BOURGOYNE

BY MS. JORDAN:

Q Mr. Bourgoyne, I'll ask you, do you have a lot of experience with drilling permit applications before the DNR?

A Generally, you know, hearings in regard to DNR for drilling permits is a very uncommon thing, you know. Generally, if you fill out the appropriate requirements and send it to DNR, they make a decision based on that.

Q Right. And it usually happens pretty quickly; isn't that correct?

A I don't know. I think, generally, you can get it

done in a reasonable period of time, yes.
Q What would that be to you? What is the typical turnaround time from when you submit an application to the DNR to when they approve it?
A I haven't studied turnaround time. I'm sorry.
Q You don't have any experience in that that you can give me any idea, days, weeks, months?
A I don't think -- within a period of a month, you often get your application filed and, you know, maybe in some cases sooner, but, again, I don't have any statistics on this. I can't really give you something I haven't studied.
Q Okay. Let's see.

CROSS-EXAMINATION OF BILL DALE

BY MS. JORDAN:
Q And, Mr. Dale, I think the last couple of questions for you.

You said Helis selected a spot on the south side of the unit, and so the only horizontal that Helis plans to drill is that one horizontal you showed in your slide?
A At this time, I think the testimony is that they are going to drill a vertical well, and if results are favorable, they will drill a horizontal. Certainly, if results are favorable, there might be other plans

that would stem from that, but I think this is only about this one well at this time, this one permit.

Q It's just about this one.

Is it your opinion that we're going to have more of these hearings for the next one and the one after that, or probably this is the only one?

A I don't know about the hearing process. This is quite unusual to have a hearing on a drilling permit. I don't know about that, hopefully not.

Q Okay. And you said part of the reason you located the unit there was to avoid this school right here; is that correct?

A No, ma'am, I didn't say that.

Q Oh, okay. I misunderstood you.

Why did you locate -- not the unit, I apologize -- why you located the well where you did within the unit was to avoid this school; isn't that correct?

A Well, we talked about two possible locations to drill a unit like this. If you'd look at other examples for the Tuscaloosa Marine Shale in the northern Florida parishes, those wells are usually located either at the north end or the south end of those units. In this case, Helis chose the south end, which is the farthest away from the school --

Q And it wasn't --

A -- and not the north end.
Q And it wasn't because of the school, it was just for some other reason?
A They did choose a location that is very remote. I went out there today. It is in the middle of nowhere.
Q My question was, did they choose that spot -- I'm going to stop after this attempt to get an answer.

Did they choose that spot within the unit in order to avoid, to be as far away as they could, from this high school? I thought that was your testimony; was it not?
A Well, we were talking about the difference between drilling either the north end or the south end. I would say that is probably a fair assumption to a location that is as far away from residences, to be the least interruptive, would be a consideration I think that they took in mind.
Q Thank you.
MS. JORDAN:

I'm going to move on to Mr. Conner now, and I'm going to be quick. I'm going to try to be quick, so, hopefully, you can give me quick answers.

CROSS-EXAMINATION OF JOHN CONNER
BY MS. JORDAN:

Q Mr. Conner, nice job with your presentation. You can give Mr. Somerhalder a run for his money there, huh?

So you said --

A I missed that.

Q I'm sorry.

A Okay.

Q You said that your job here was to -- well, you said your job in general is to deal with environmental problems; is that correct?

A Well, my job is to do environmental management -- environmental management issues for industrial operations, and sometimes those are problems, yes.

Q And so you pretty much work for industry; isn't that correct?

A I've worked for a lot of industry. I've also worked for USEPA and many different state agencies and many foreign governments.

Q And you -- you've testified before, I know, correct?

A Yes.

Q And that's been for industry?

A For many times, it has been for industry, yes.

Q Okay. I have some questions here.

You talked a lot about things that Helis is

willing to do that, according to you, go beyond the regulatory requirements; is that correct?
A Yes. I did mention a number of things in that regard.
Q And so those things that go beyond the regulatory requirements, is Helis willing to put all of those things into a legally enforceable document?
A I know that Helis is doing that. In terms of what sort of legal enforceable document that they are entering into, that's not within my purview. I know that that is the program, that they're going to do those things. I know they've been in conversations with representatives of the community in that regard. I don't know what documentation surrounds that.
Q Have you seen any other documents, besides this printout of the slide presentation, where Helis commits to doing those extra things that you just discussed?
A I've seen some correspondence between Helis and I believe the St. Tammany Parish or perhaps Abita Springs that discussed some of those elements.
Q But nothing that appears legally enforceable; is that correct?
A I don't know to what degree those conversations are legal contracts or not. I'm not knowledgeable

about that.
Q Would you have any problem with the Department of Natural Resources conditioning Helis's drilling permit on all of those extra things that you said Helis was willing to do?
A That's not something in my area to say whether or not that would an appropriate action. I think that they are going to do those things. What action of that nature is irrelevant.
Q One of the things you said Helis is willing to do that's extra and not required is, you said that they will put all of the frac fluid chemicals on FracFocus and make everyone aware of that, that was one of the things that you named, correct?
A Yes.
Q And in your interpretation, that is above and beyond what the regulations require?
A No, that's not above and beyond. The -- what's above and beyond is not to post them on FracFocus but to encourage all of the contractors to not use trade secrets.
Right now, Section 188 of LA 29-B allows for trade secrets. It's Helis's policy to not use trade secretive provisions.
Q Okay. And they would be willing to put that in

their permit, as well?
A I don't know what their permit entails. I know that that's their plan to do that, that's their policy here and elsewhere.
Q But that disclosure that you just discussed where they won't claim trade secret, that happens after they frac the well; is that correct?
A The information on what goes in the well has to posted within 20 days after drilling, and it's posted by the parties that actually do the work. So the contractor does the work, and they need to promptly post that. It's not posted beforehand.
Q So, is it fair to say that going beyond the requirements would mean posting it before you frac the well?
A Well, the requirements aren't to post it beforehand for certain practical reasons, because the chemical mixture that goes in the well is decided on a very site-specific basis, and it's posted by the contractor. If the contractor uses those chemicals, they are immediately required to disclose those. They can't disclose them because they haven't used them until they've used them.
Q Okay. All right.
A That's the practicality of it.

Q Okay. You said that the nearest water well was -- I'm sorry -- a mile and a half away from the drilling location; is that correct?
A The nearest domestic or commercial water supply or drinking water well, yes.
Q Okay. Domestic or commercial, does that include public?
A Yes, it does, yes.
Q Okay. And so is that going from the actual drill site when you measured that mile and a half?
A Yes.
Q Okay. So that wasn't going from the horizontal fracing will be, you didn't determine it from there, correct, because that's a mile you said, right?
A It will be -- on the drawing that you saw, we were looking at the distance from the vertical section of the well which is the point of -- the principal point of concern. We also looked at the distance from the horizontal section of this well to see how far that was.
Q How far was that?
A It's still over two miles away, because the -- you can see it on the drawings that the well -- the horizontal extends to the north and then is roughly one-half mile west of where we are right now. At that

point, it's two miles deep, so the -- well, it's over two miles deep. So, being a half mile to -- west and two miles deep, puts it over two miles away.

Q Okay.

A On a straight line.

Q Okay. You showed a slide where you showed the direction that the groundwater is moving. How did you determine that?

A There have been a number of studies that have been done by the Louisiana Geologic Survey and the USGS to measure wells throughout this area to determine which way the water moves, and there's a series of publications that have documented that.

Q So you talked a lot about the monitoring system and that is going above and beyond the regulations, which isn't hard to do, by the way, because the regulations aren't very good, but in connected to the monitoring system, are you all willing to put that monitoring system and all the details about it into a legally enforceable document?

A Again, I can't speak for the legal aspects of that. I know that Helis is working with a contractor to develop a plan, a written plan, that will be made available, and I know that they are in consultation -- my understanding there has been consultation with

St. Tammany Parish and Abita Springs regarding the sharing of that information.

Q I don't think Abita Springs. I represent them, and I would have heard about that, but maybe St. Tammany Parish.

So all of these monitoring wells and all of the extra stuff that you're going to do, you're talking about this particular well; is that correct?

A Yes. We're talking about this well.

Q If this well is successful, it's safe to say Helis will drill many more wells in this area; is it not?

A Well, I don't know about that.

Q Let's talk about if Helis drills anymore wells in this area, anymore wells it drills from one to 100, will you all commit to doing all of these extra things for every well you have in the future or just the one that's getting this hearing and getting all this extra attention?

A I think the question there is that, if anymore wells are drilled, they also require a permit and then that is a separate issue for potentially a separate hearing and a separate permit discussion, and then those provisions would be in question at that time, too.

My understanding are, these are the policies that Helis plans to use on their operations here in St. Tammany Parish. I can't talk in detail about other wells, but I would anticipate the same protective measures would be in effect for good operations.

Q And they would be willing to do that in a legally enforceable document?

A I can't speak for the legal aspects of that.

Q Okay. The cement that you talked about in your little slide that goes next to the casing, how thick is that cement?

A The cement is -- it varies on the different sections. I don't have that right in front of me. Dr. Bourgoyne may be able to answer that question.

Q I'm sorry. Say that --

A I don't have the numbers right in front of me, but it's a matter of inches.

Q It looks like two inches or something like that, right?

A It's -- it depends on which casing section you're talking about.

Q Okay.

A I don't know the exact distance, but it's a matter of inches, yes.

Q Okay. All right. One second. I'm almost done.
When you talked about the water monitoring, you said you were going to do cluster sampling. What does that mean?
A Well, maybe I didn't state it clearly. It's a well cluster. It's groups of wells that are right next to each other, so in -- for example, since many of the water wells in this area are 250' and then others are 500' and another is 1,200', there would be a triplet of wells, a cluster of three wells, one which went to 250, another one which went to 500, and the other one 1,200', that was called a cluster.
Q So it measures three different depths?
A Yes. There are three wells that are placed close to each other to test three different depths.
Q How close to each other are they?
A Just depends on physically how proximate you can get them. Sometimes they're 10', sometimes they're 20' away. It's -- you try to put them close together just for purpose of convenience.
Q Because your well pad is only three acres, so you couldn't put them much farther apart than that, right?
A No, you couldn't -- in this case, the clusters are going -- there will be a cluster at the east -- I'm sorry -- the west edge of the pad, one on the --

there will be one well on the north side of the pad, and another cluster on the south side of the pad. They're put close because that gives you the best confidence of catching a problem early, if there were a problem.

Q Close to one another, but they're supposed to be upgradient and downgradient; is that not correct?

A Yes. With the water being flowed to the south -- southwest, there will be on the upgradient and the downgradient side of the pad.

Q And at that distance, that close together, there's not very much difference between upgradient and downgradient, is there?

A No, there's not much difference. The fact that -- the key thing is that they're very close to the area that you're concerned about. If there's a casing problem, you want the detection well, that center well, to be close to that casing.

Q Two more questions.

One, you talked about the surface water that Helis is going to use to frac the well, and you said you were going to get it from private ponds. What private ponds exactly?

A I don't know which ponds exactly. I know that Helis has been in discussion with different parties to

obtain a feasible water source.
Q So you don't have any personal knowledge of what ponds those might be?
A No, I don't, no.
Q And you don't have any personal knowledge of whether the water that ends up in those ponds actually comes from somewhere else, like a stream?
A I know that -- I know that they investigated that fact, but these are not ponds that are connected to any streams. They are shallow lakes or ponds on private property. They are not connected to any other source of water.
Q So you know they're not connected to a stream, but you didn't know which ponds they were? I don't understand that.
A Yes, that's right. No, I don't. I know that there is -- wait, okay. No, I don't know which sort of ponds they are. I know there are a variety of ponds they've looked at.
Q Can you give us an approximate area of where they are?
A I know there's some to the west and there are some to the east, but I don't know specifically which ponds they are.
Q Okay. And a shallow pond, would that -- there's

not very much distance -- where did the water in shallow ponds come from?

A It depends on the location of the pond. It can be -- it can, most of it in this area where you have 68 inches of rainwater -- rainfall every year, it's going to be rainfall. This is a very wet area of the country. It also can be, in some areas if it intersects the shallow groundwater, it will have some groundwater in it because it's a direct communication.

Q How much water is in these ponds that Helis plans to use?

A I don't know.

Q Okay. You don't know that either?

You know it's not a stream though -- it's not coming from a stream, but you don't know how much water is in it.

How much water do they need to frac?

A To do the vertical well section, they estimate they would need approximately 800,000 gallons of water. To do the next section, they will need five million gallons of water to do the horizontal.

Q Okay.

A To both drill and hydraulically frac the horizontal, you will need five million gallons of water.

Q And that is each time they send out a horizontal fracturing pipe or whatever you call it -- each time they do that, each time they horizontally frac a new area, they need five million gallons, correct?
A Each time they do a horizontal section of this magnitude of length, they would need five -- between three to five million gallons of water for the entirety of the stretch. For each stage, it's 100- to 200,000 gallons of water, then it depends on how many stages you do, what it adds up to.
Q And it's your understanding that there is enough water in this one or two ponds that you've discussed to cover the future plans of Helis to frac in this -- let's just take this unit? Is there enough water in these ponds to cover Helis's future plans to frac in this unit, if this vertical well proves successful?
A I don't know if -- I haven't looked at Helis's plans on future water supplies. I know that is their plans for these wells, and it comports with the State policy --
Q Okay.
A -- to use surface water.
Q Last question.
You talked about the frac fluid and how Helis is going to dispose of it. You said it's going to go in

an injection well; is that correct?
A It can go to a number of different locations. There are permitted injection wells in different parishes in Louisiana, that would be one of the options, that would be a common disposal option, yes.
Q And you actually did say it would go to an injection well, so now you're saying it might not go to an injection well, it might be disposed of some other way?
A My understanding is that it would go to an injection well.
Q And you don't have any idea where that injection well would be?
A The injection well would be one of those that are more proximate to this area, most likely, but there are a lot of injection well companies, and so those contracts haven't been specified yet because they don't have a drilling permit yet.
Q But you're saying it would be some place close by?
A You can see on the map I put up they're not -- they're not really close by, but -- they're several miles outside of the parish, but there's a number of options, different companies that do that work.
MS. JORDAN:

That's it. Thank you.

We have just a few more questions for Mr. Bourgoyne from my colleague, and then I think we're ready -- we'll be ready for the public, so don't leave.

I'm sorry. I'm sorry. Let me just say -- I'm sorry, guys. We have one witness. We did have two listed, but we're only going to call one so that you all can get out of here, but we really need to put him on. We're going to keep him as quick as possible. I promise.

MS. WICK:

Good evening, Dr. Bourgoyne. My name is Caroline Wick. I'm a student attorney with Tulane Environmental Law Clinic, and I'm going to sit because my legs may give out from underneath me if I stand.

CROSS-EXAMINATION OF ADAM (TED) BOURGOYNE

BY MS. WICK:

Q Have you testified before?

A Yes.

Q Okay. Have you ever testified against an oil and gas company?

A Yes.

Q Can you tell us about that?

A You know, I don't remember the particulars. I've been a professional petroleum engineer for 45 years. During that time, I've gotten involved, you know, with a lot of disputes. I can remember in and -- you know, and some of the cases don't -- didn't necessarily go to testify.
Q Okay. You've been involved in a infamous dispute, one of the times you testified for BP, correct?
A I did testify for BP, yes, ma'am.
Q What was it regarding?
A It was regarding -- it had to do with the BP accident, the Macondo accident, in the deepwater horizon.
Q Overall, you found that BP's decisions were safe, in accordance with federal regulations, and consistent with industry standards, correct?
A No, I don't think that's a correct --
Q Okay. Did you testify that BP's decision's during drilling had nothing to do with the blowout, explosion, or spill?
A No, that's not correct either.
Q No?
MR. REVELS:
Mr. Henry, let me just make one continuing

objection. She can ask whatever she wants that you allow, but just reading -- we're following -- supposedly following the Rules of Procedure that we use for hearings. It says, cross-examination should be limited to questions concerning the testimony and exhibits presented by the witness. I'm just reading your own rules.

To me, this BP-Macondo is clearly nothing that he testified and nothing relating to his testimony and exhibits for --

MR. HENRY:

Your objection is noted, but I'm going to go ahead and let the questioning continue.

BY MS. WICK:

Q I'm reading from the Court decision here. Dr. Bourgoyne points out that the blowout occurred during the temporary abandonment procedure days after the drilling phase concluded. He concludes then that BP's decision during drilling had nothing to do with the blowout, explosion, or spill.

A No, that's not a correct statement. You're misreading that.

Q Okay. I'd like to move on to your testimony today.

First, I'd like to start, you said that -- my

first question is, do you believe that, even if Helis complies with Louisiana's regulations, that they are strong enough to protect the Southern Hills Aquifer, a sole-source aquifer for St. Tammany Parish?
A Yes. I think DNR and the Office of Conservation does a good job in regulating the oil and gas industry.
Q Are you aware of the STRONGER report?
A Are you talking about the auditor's report?
Q I'm talking about the -- this report right here, this State Review of Oil and Natural Gas Environmental Regulations (indicating)?
A No, I don't --
Q It's an independent agency that reviews regulations?
A No, I haven't read it.
Q Okay. They reviewed fracing regulations, and they found a number of deficiencies in Louisiana's regulations. One problem was that the minimum depth of casing is required to protect the aquifer.
Helis has promised to put in 4,000' of three strings of casing to protect the aquifer here, and there are slides in your presentation here today, if I hear that correctly?
A Yes, that's correct, and that is 600' deeper than

the aquifer.
Q Okay. Is Helis going to put that in a legally enforceable document?
A You know, you'd have to ask Helis that, but that's their plan, and I -- that's what -- you know, that's what they submitted that they will do.
Q Okay. Is there anybody here from Helis that can promise that they will put in three strings of casing to protect the aquifer?
A That's in their plan. They've said they were going to do it, so I think Helis has made that promise. I can't promise for Helis. I'm not an agent of Helis that can speak for them in that regard, in a legally binding-type contract, which is what you're asking.
Q Okay. These three strings of casing, can you tell me how thick the cement is to protect the aquifer and how many layers of cement there are?
A I think it's included in my exhibit.
Q I know, but I don't always understand --
A Do you want me to just read out of the exhibit for you?
It's a 17-1/2" hole and 13-3/8" casing, so the space between the hole -- and, of course, the 17-1/2 is the size of the bit. The hole will enlarge some

after it's drilled, you know, so you can get your cement sheath thickness based on those two dimensions, if it would fill the space in between. And then the second cement sheath would be inside of the 13-3/8" casing and outside of the 9-5/8" casing, and that sheath would be 12.415" by 9-5/8". It would fill the space between those two diameters. These are concentric strings, you understand.

Q About the cement, right now Louisiana's regulations have no specific standards or requirements for cement use in well construction, and I'm wondering how Helis is going to test their cement? There is a number of tests that the API recommends to test the strength of the cement.

A Well, the important thing is the check the casing seat, so they will do a -- what they call a formation integrity test, which is a pressure test.

Q That's to test the steel casing?

A That tests the seal between the cement and the casing at the casing seat, at the bottom of the casing.

Q Well, what about testing the actual cement?

A And, in addition, they will run what you call cement bond logs.

Q Okay. We just wanted to make sure that Helis is

going to do that, because that wasn't mentioned in the presentation, and, again, it would be great if we could get it in a legally enforceable document. The cement protects the aquifer.

A It's my understanding that the well plan calls for a cement bond log to be run, but, again, this is between Helis and DNR. DNR is -- and the Office of Conservation are the ones that regulates the industry, and they go out and they -- when the casing is tested, their inspector is there. He witnesses the test and so forth, and they get their weekly record of what is being done, and they make site visits. You know, it's their job to see that it's done safely. They have been given that responsibility.

Q I understand.

A Under the Louisiana Revised Statute.

Q Are you aware of the Louisiana Legislative Auditor report of the Department of Conservation?

A I am aware of it, yes.

Q And are you aware of some of the principal findings in the report that insufficient inspections are conducted, penalties aren't issued, there's no enforcement -- there's no written enforcement process?

A Well, they've had some criticisms. You know, I think like a lot of --

Q These criticisms are written by a Louisiana agency. It's the Louisiana Legislative Auditor.
A Yes, it was, and I think, by and large, the Office of Conservation agreed that they needed to address some of these things, but, you know, a lot of this just has to do with the available number of inspectors and the number of jobs and so forth.
And a lot of the criticism had to do with the orphan well program, which, of course, has been here for -- you know, an area of concern for quite a long time.
Q I guess my point with this line of questioning is that, if we're going to rely on the Department of Conservation to inspect, maybe we should question that assumption. This report seems to indicate that they're not doing inspections, that they're not issuing penalties, and that there's no written enforcement process.
A Well, I disagree with that.
Q Okay. I just want to ask you a couple more questions about the actual drilling.
Can you tell me what is in the drilling muds?
A Can I tell you what?
Q What's in the drilling muds?
A That they will be used to drill through the

aquifer?
Q Right.
A Well, it's mostly water, about 95 percent water, and about five percent solids. Most of that solid will be bentonite clay. There will a polymer added, is my understanding, to help desensitize the clay so it doesn't turn into gumbo quite as easily. I think they call it PHPA, that -- you know, that is a common surface water-based mud added with -- the mud company has selected is Newpark offices out of New Orleans, and they are a reputable company. All of these products are pretty much benign -- or are benign.

The PHPA polymer is probably one that -- is the only one that I know of that I would say wouldn't go into like food products. The bentonite, you -- sometimes you find in ice cream and in other type of food products. So it's really a very natural system that they're using, other than, you know, just a few chemicals, which are polymers to kind of help --
Q Those are the drilling muds that are used for the vertical well. What about the drilling muds that are used for the horizontal well?
A The drilling mud to be used in the horizontal well will be an oil-based mud.
Q An oil-based.

Okay. Thank you.

Are you going to use diesels and frac the well, to do the actual fracing?

A No. The fracing will be done with a water carrier, water and proppant, probably a proppant that has a higher compression strength, you know, like bauxite or something like that.

MS. WICK:

Okay. Thank you, that concludes my questioning.

MR. HENRY:

We're going to take a short five-minute recess just so everybody can head to the restroom and whatnot, and we'll start back briefly.

(Brief recess.)

LACOMBE BAYOU FIELD, DOCKET NO. ENG 14-0626
HELIS OIL AND GAS COMPANY
NOVEMBER 20, 2014

CERTIFICATE

I, MICHELLE S. ABADIE, Certified Court Reporter in and for the State of Louisiana, as the officer before whom this testimony was taken, do hereby certify that after being sworn before Daniel Henry, Staff Attorney with the Office of Conservation, on November 12, 2014, at Lakeshore High School, Mandeville, Louisiana, that the testimony taken in Docket ENG 14-0626 was reported by me in the stenomask reporting method, was prepared and transcribed by me or under my personal direction and supervision; that the foregoing pages, numbered 79 through 198, is **an excerpt and copy** of the true and correct original transcript to the best of my ability and understanding; that I am not related to counsel or to the parties herein, nor am I otherwise interested in the outcome of this proceeding.

COPY

MICHELLE S. ABADIE, CCR #24032
CERTIFIED COURT REPORTER

EXHIBITS PRESENTED

By Helis Oil and Gas

November 12, 2014

Helis Hearing – St Tammany Parish, LA
Engineering Docket No. 14-626

5 p.m. November 12, 2014
Lakeshore High School Gymnasium

Helis Oil Drilling Permit Application
Eads Poitevent et al No. 1 Well

HELIS EXHIBITS (from Hearing)

W. H. ROBBINS & ASSOCIATES, LLC
CONSULTING GEOLOGISTS
Lafayette, Louisiana

Wilton R. "Bill" Dale, Jr.

- **Education:**

  B.S., Lousiana State Univeristy, 1978

- **Experience:**

  35 Years of Exploration and Consulting Experience in the Oil and Gas Industry.

  Previously Testified as an Expert Witness in Petroleum Geology Before the Office of Conservation.

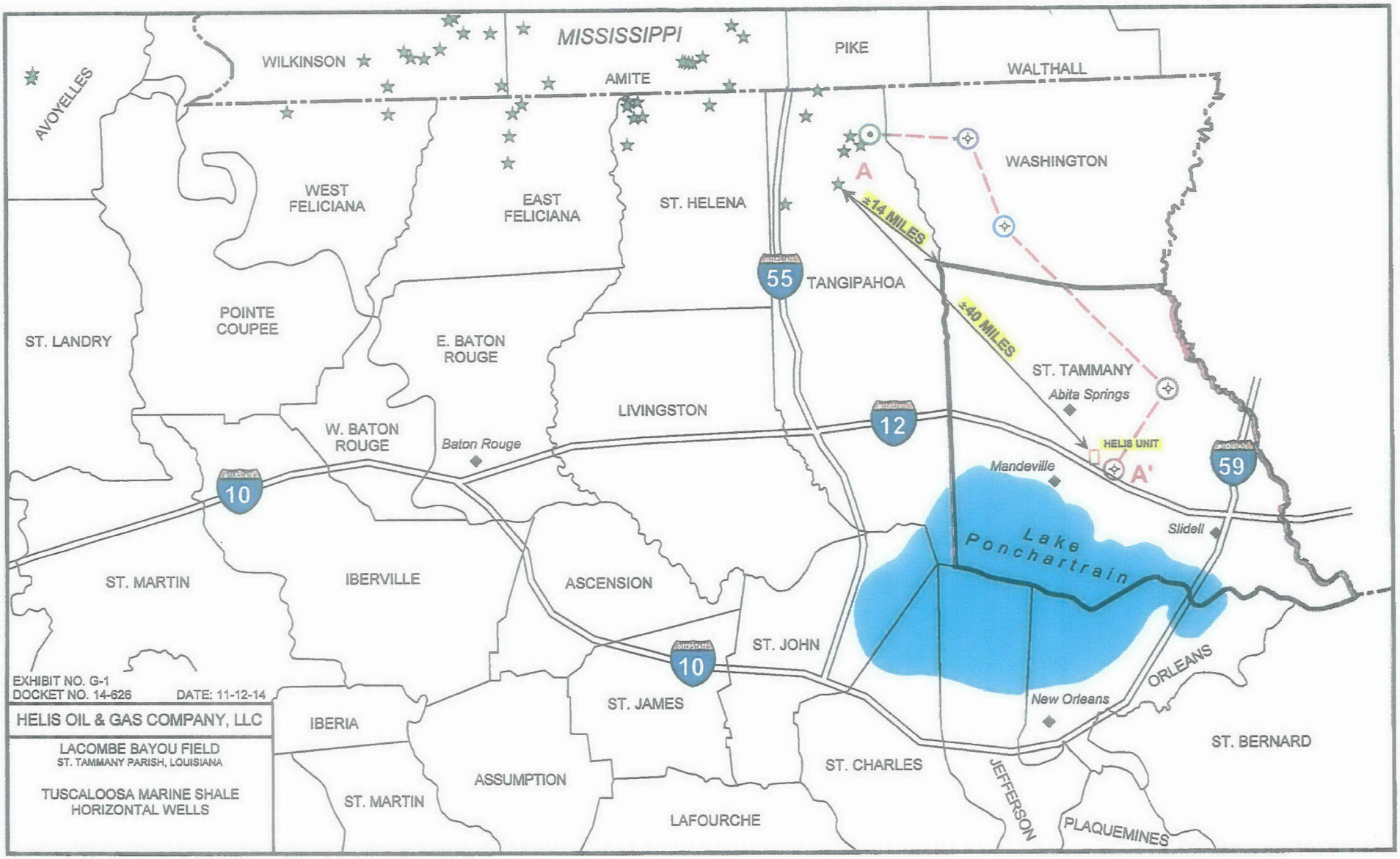
HELIS OIL & GAS, LLC

Helis Oil & Gas is a privately owned oil & gas exploration company based in New Orleans since 1934.

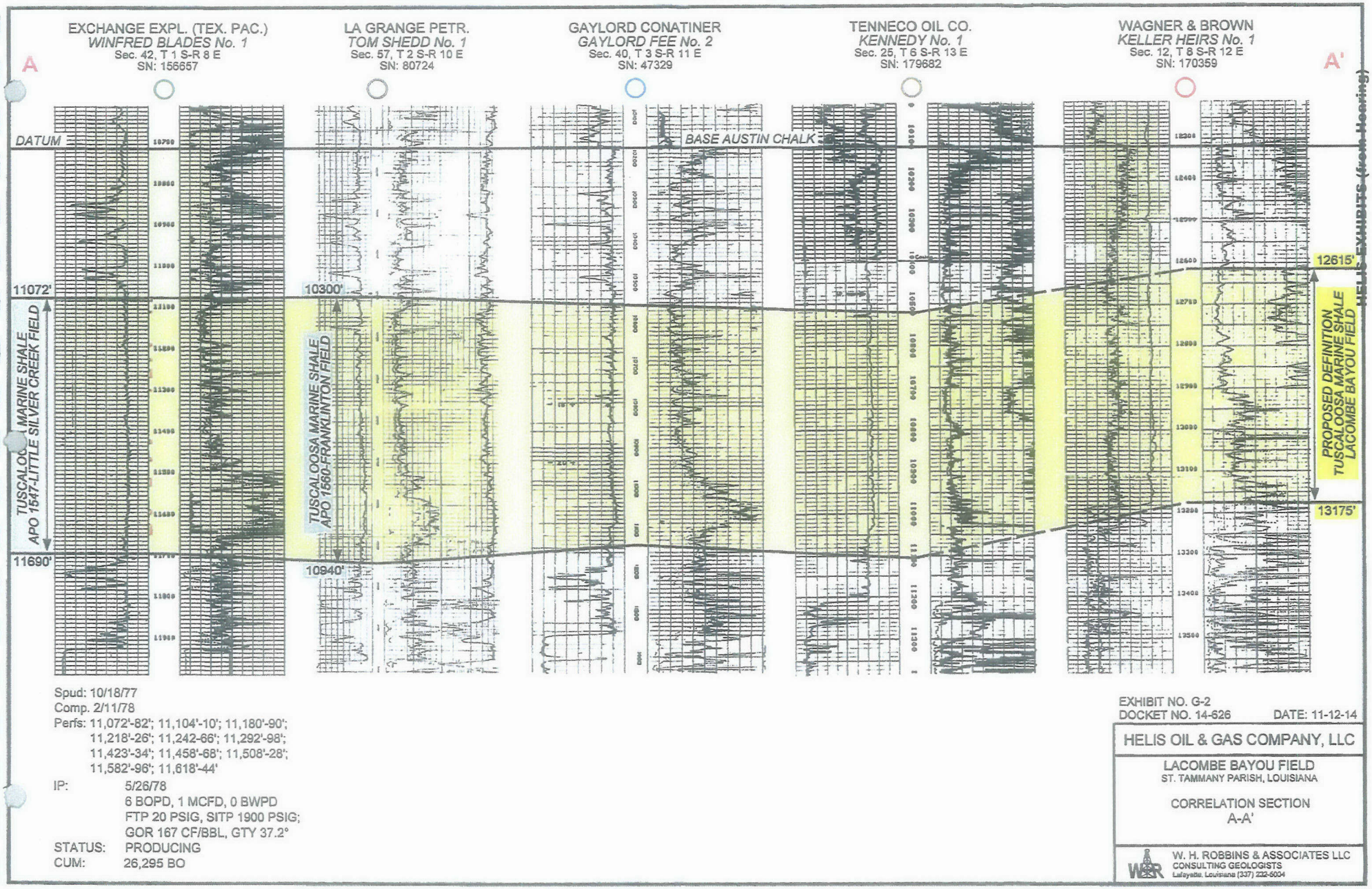
Helis has owned and operated wells throughout the nation and has had extensive operations on private, federal and state lands, as well as in federal offshore waters and inland state waters in Louisiana.

In recent years, Helis has drilled and hydraulically fractured approximately 60 horizontal wells such as planned for the Lacombe Bayou field.

Helis employs best practices in the industry and strives to meet or exceed all applicable safety standards..



HELIS EXHIBITS (from Hearing)



Spud: 10/18/77
Comp. 2/11/78
Perfs: 11,072'-82'; 11,104'-10'; 11,180'-90';
11,218'-26'; 11,242-66'; 11,292'-98';
11,423'-34'; 11,458'-68'; 11,508'-28';
11,582'-96'; 11,618'-44'

IP: 5/26/78
6 BOPD, 1 MCFD, 0 BWPD
FTP 20 PSIG, SITP 1900 PSIG;
GOR 167 CF/BBL, GTY 37.2°

STATUS: PRODUCING
CUM: 26,295 BO

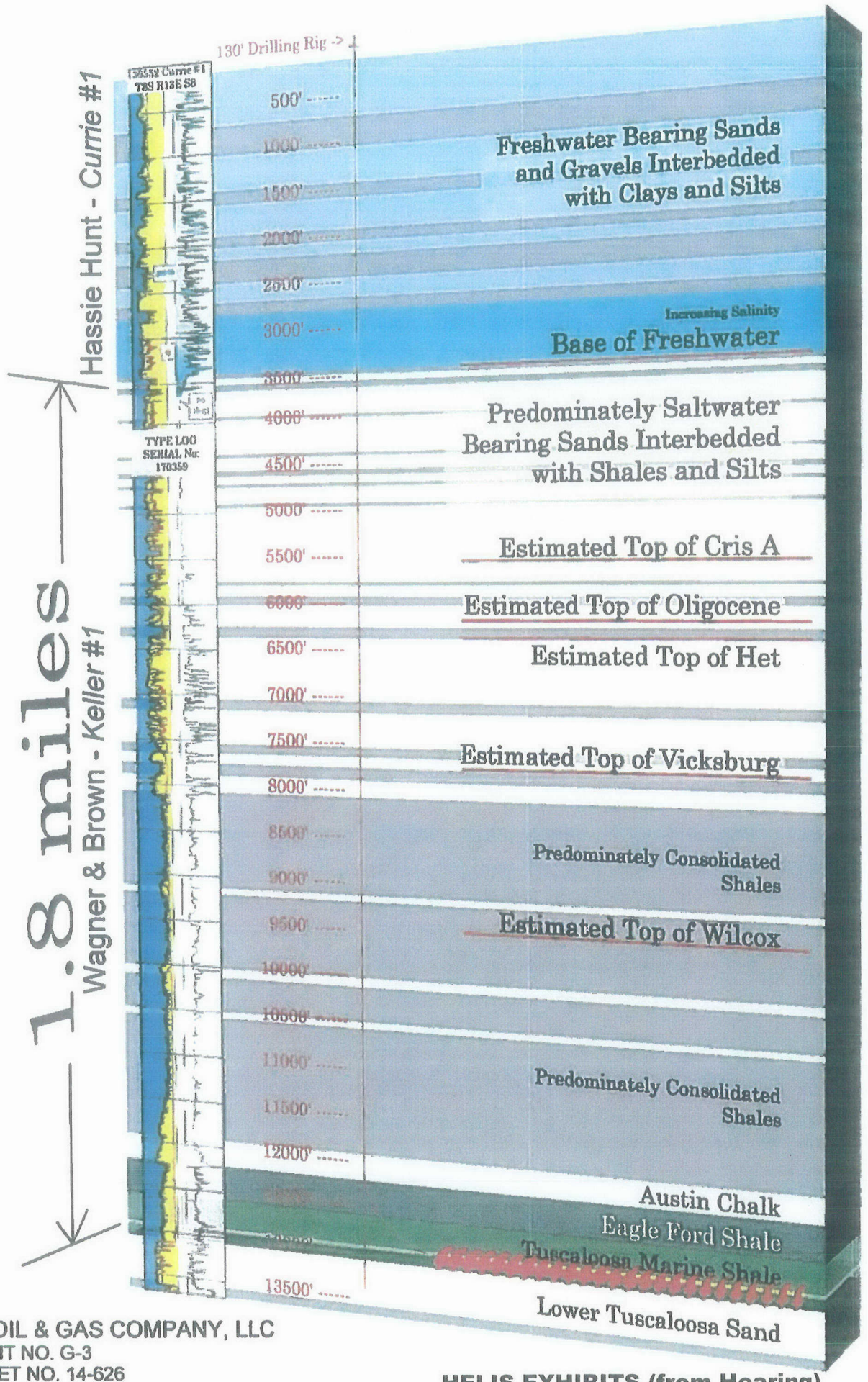
EXHIBIT NO. G-2
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

CORRELATION SECTION
A-A'

W. H. ROBBINS & ASSOCIATES LLC
CONSULTING GEOLOGISTS
Lafayette, Louisiana (337) 232-5004

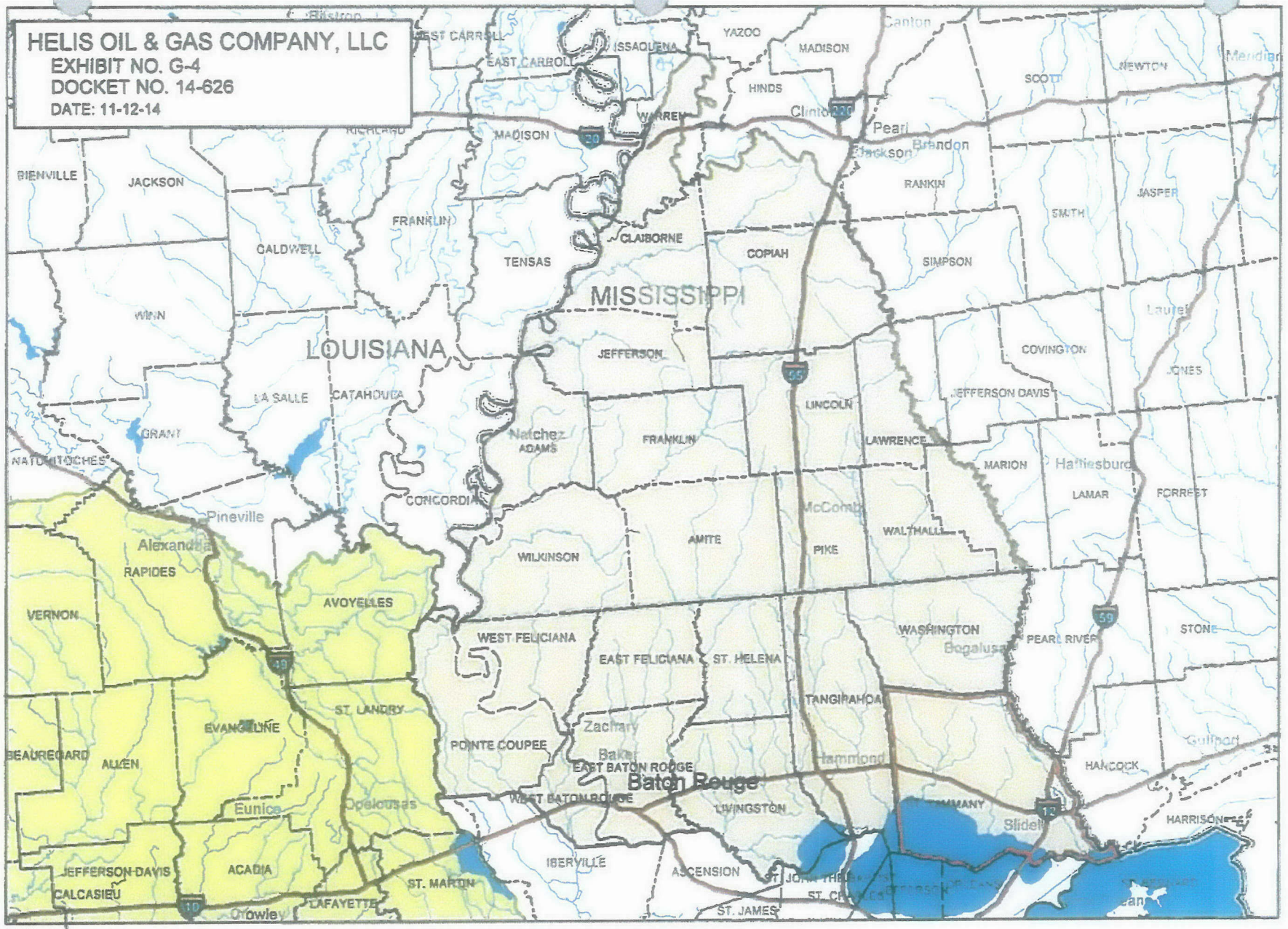


HELIS OIL & GAS COMPANY, LLC
EXHIBIT NO. G-3
DOCKET NO. 14-626
DATE: 11-12-14

HELIS EXHIBITS (from Hearing)

HELIS OIL & GAS COMPANY, LLC
EXHIBIT NO. G-4
DOCKET NO. 14-626
DATE: 11-12-14

HELIS EXHIBITS (from Hearing)



STATE
COUNTY OR PARISH
CHICOT AQUIFER SYSTEM
SOUTHERN HILLS AQUIFER SYSTEM

Southern Hills Aquifer System

N
W E
S

0 10 20 40
Miles

EPA Region 6
GIS Support
01/30/2008

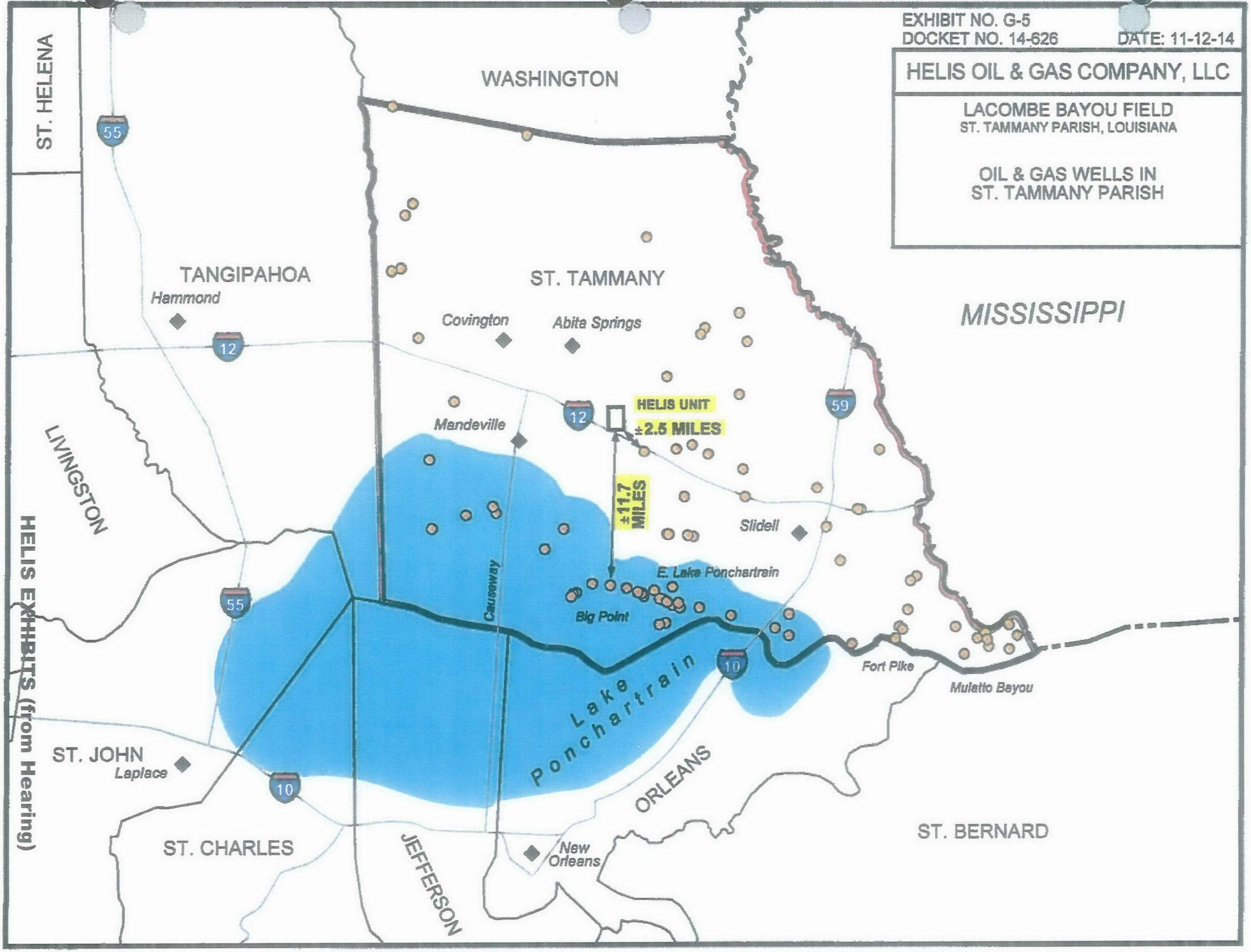
20080130ML04

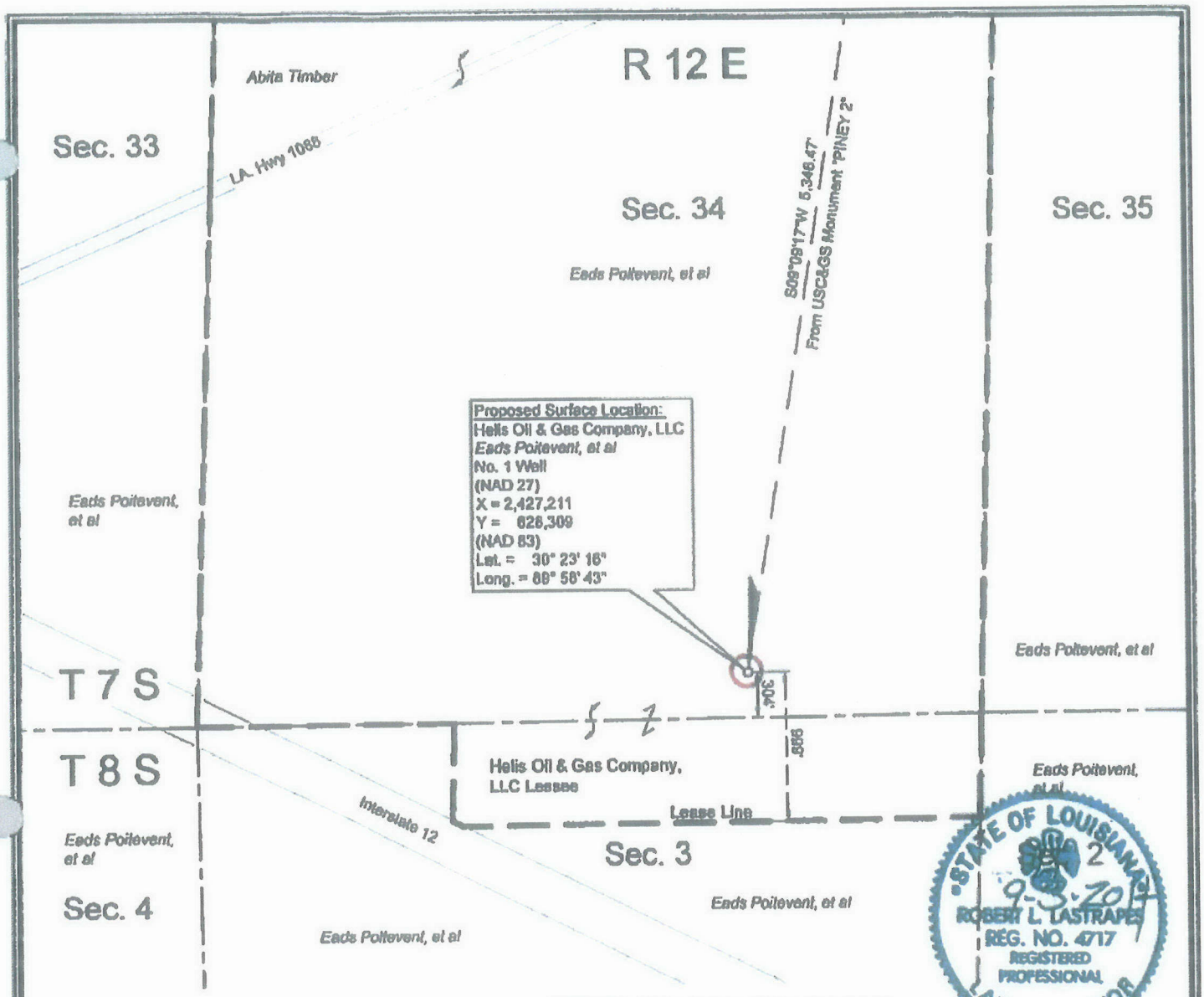
EXHIBIT NO. G-5
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

OIL & GAS WELLS IN
ST. TAMMANY PARISH





NOTE: This plat is not a property boundary survey and as such does not comply with the "Standards of Practice for Property Boundary Surveys" as adopted by the Louisiana Professional Engineering Land Surveying Board.

There are no residential or commercial structures, not owned by the applicant, his lessor, or other predecessor in interest, within a 500' radius of the proposed location as of 08/03/2014

Robert L. Lastrapes
Professional Land Surveyor
Registration No.4717

Helis Oil & Gas Company, LLC -
Eads Poitevent, et al No. 1 Well
Prepared September 3, 2014 as follows:
Location being S09°09'17"W 5,348.47' from USC&GS Monument "PINEY 2", located in Section 34 T7S-R12E St. Tammany Parish, Louisiana.

NAD 27 Louisiana South

Elevation of ground at location±29'

1,000' 0 500' 1,000'
Scale: 1" = 1000'

HELIS OIL & GAS COMPANY, LLC

Eads Poitevent, et al No. 1 Well
SECTION 34 T7S-R12E
St. Tammany Parish, Louisiana

FENSTERMAKER
135 Regency Sq. Lafayette, LA 70508
Ph 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

DRAWN BY: TSM	REVISIONS
PROJ. MGR.: TSM	
DATE: 09/03/2014	
FILENAME: T:\2013\2130980\DWG\Eads Poitevent No.1 Well.dwg	

HELIS OIL & GAS COMPANY, LLC
EXHIBIT NO. G-6
DOCKET NO. 14-626
HELIS EXHIBITS (from Hearing)

HELIS EXHIBITS (from Hearing)

NAD 27 Louisiana South Zone

SCALE
2,000' 0 1,000' 2,000'

EXHIBIT NO. G-7A
DOCKET NO. 14-626
DATE: 11-12-14

FENSTERMAKER
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

Aerial Photography
USDA-FSA-APFO NAIP Mosaic
Date: 2013

HELIS OIL & GAS COMPANY, LLC

Eads Poitevent, et al No. 1 Well
Section 34 T7S-R12E
Saint Tammany Parish, Louisiana

DRAWN BY: TSM	DATE: 10/15/2014	PROJ. MGR.: TSM
FILENAME: T:\2013\2130980\DWG\Historical Aerials.dwg		

HELIS EXHIBITS (from Hearing)

EXHIBIT NO. G-7B
DOCKET NO. 14-626
DATE: 11-12-14

FENSTERMAKER
135 Regency Sq. Lafayette, LA 70508
Ph. 337-237-2200 Fax. 337-232-3299
www.fenstermaker.com

Aerial Photography
USDA-FSA-APFO NAIP Mosaic
Date: 2013

HELIS OIL & GAS COMPANY, LLC

Eads Poitevent, et al No. 1 Well
Section 34 T7S-R12E
Saint Tammany Parish, Louisiana

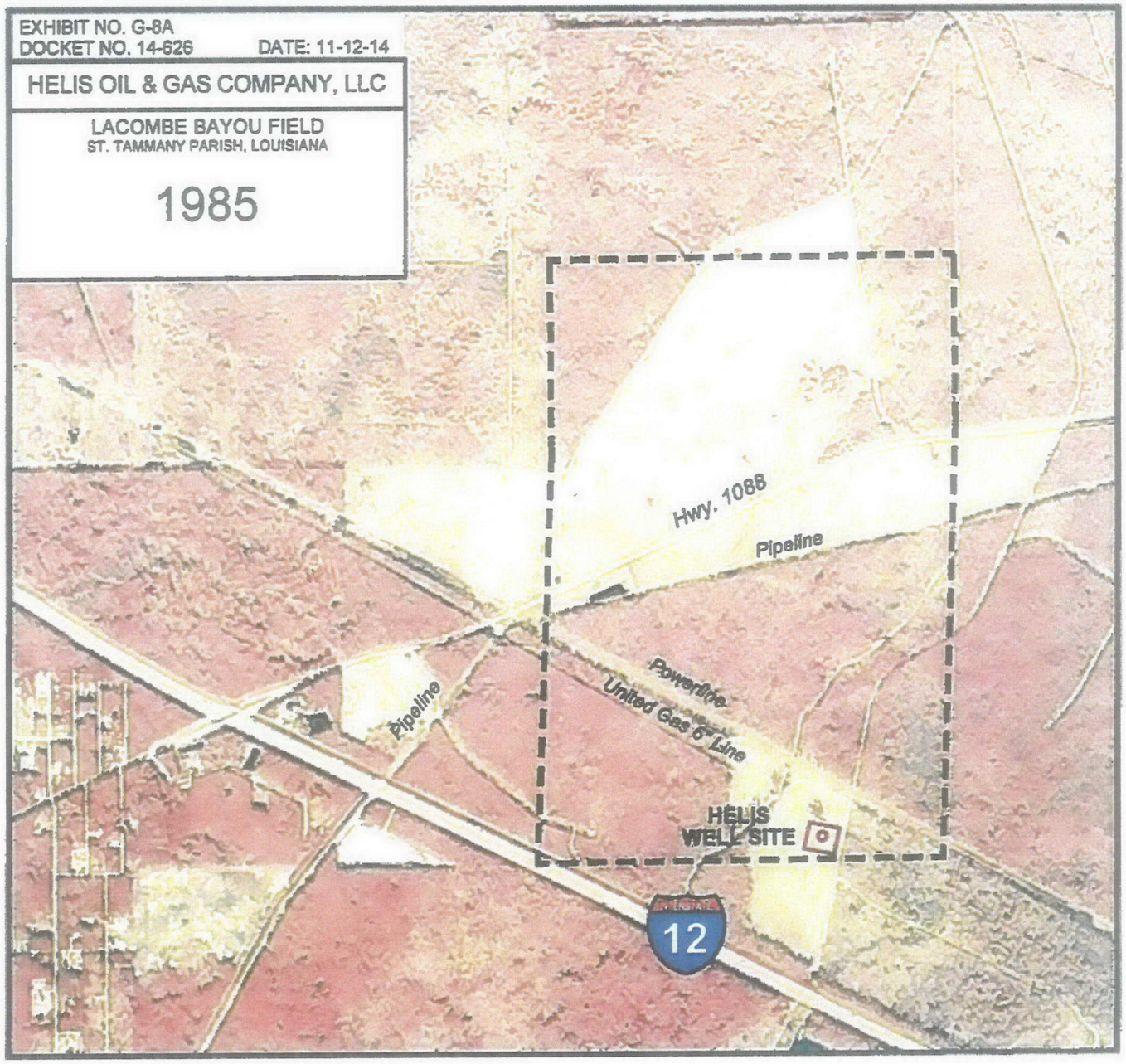
DRAWN BY: TSM	DATE: 10/15/2014	PROJ. MGR.: TSM	
FILENAME: T:\2013\2130980\DWG\Historical Aerials.dwg			

EXHIBIT NO. G-8A
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

1985



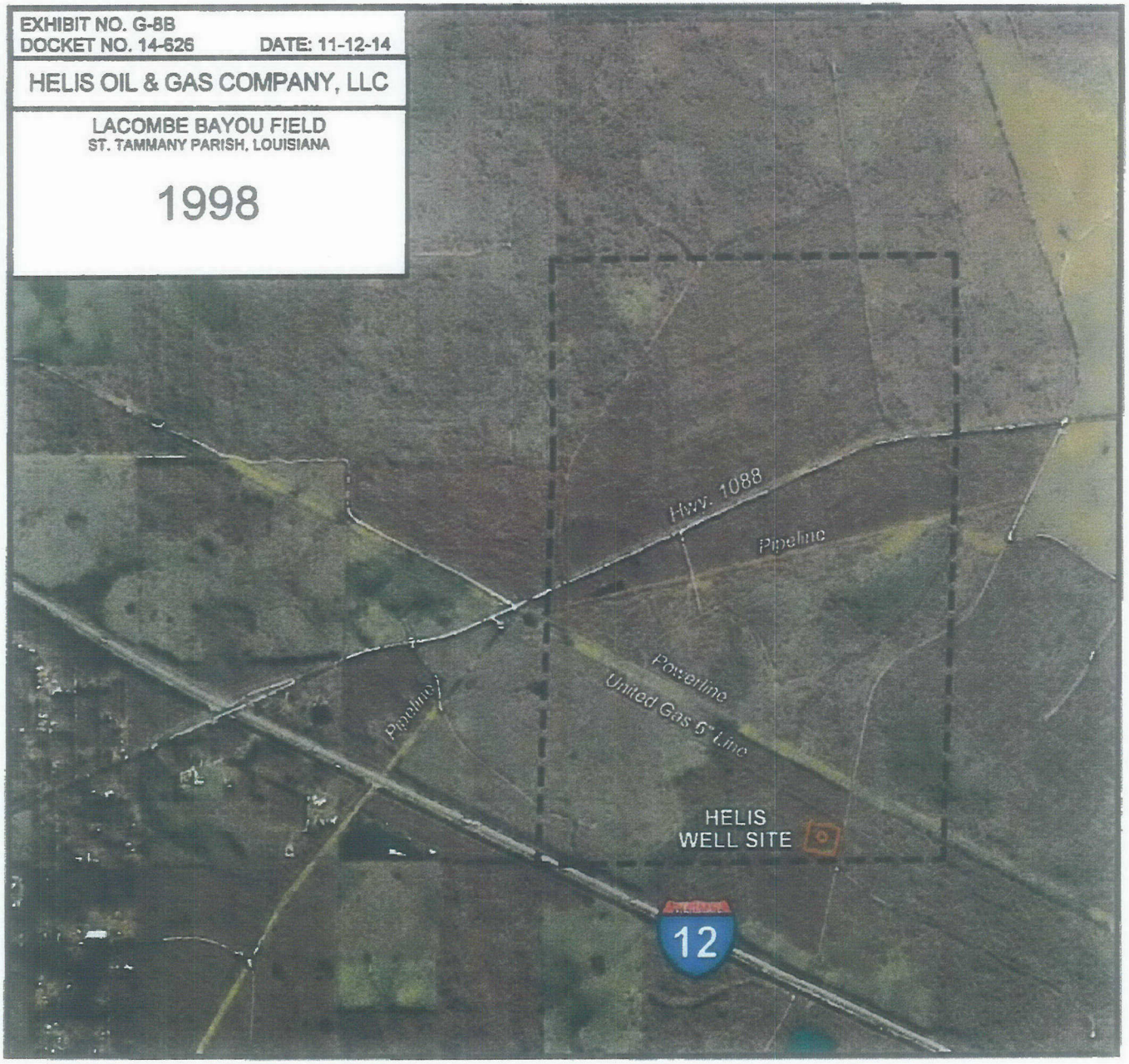
HELIS EXHIBITS (from Hearing)

EXHIBIT NO. G-8B
DOCKET NO. 14-626 DATE: 11-12-14

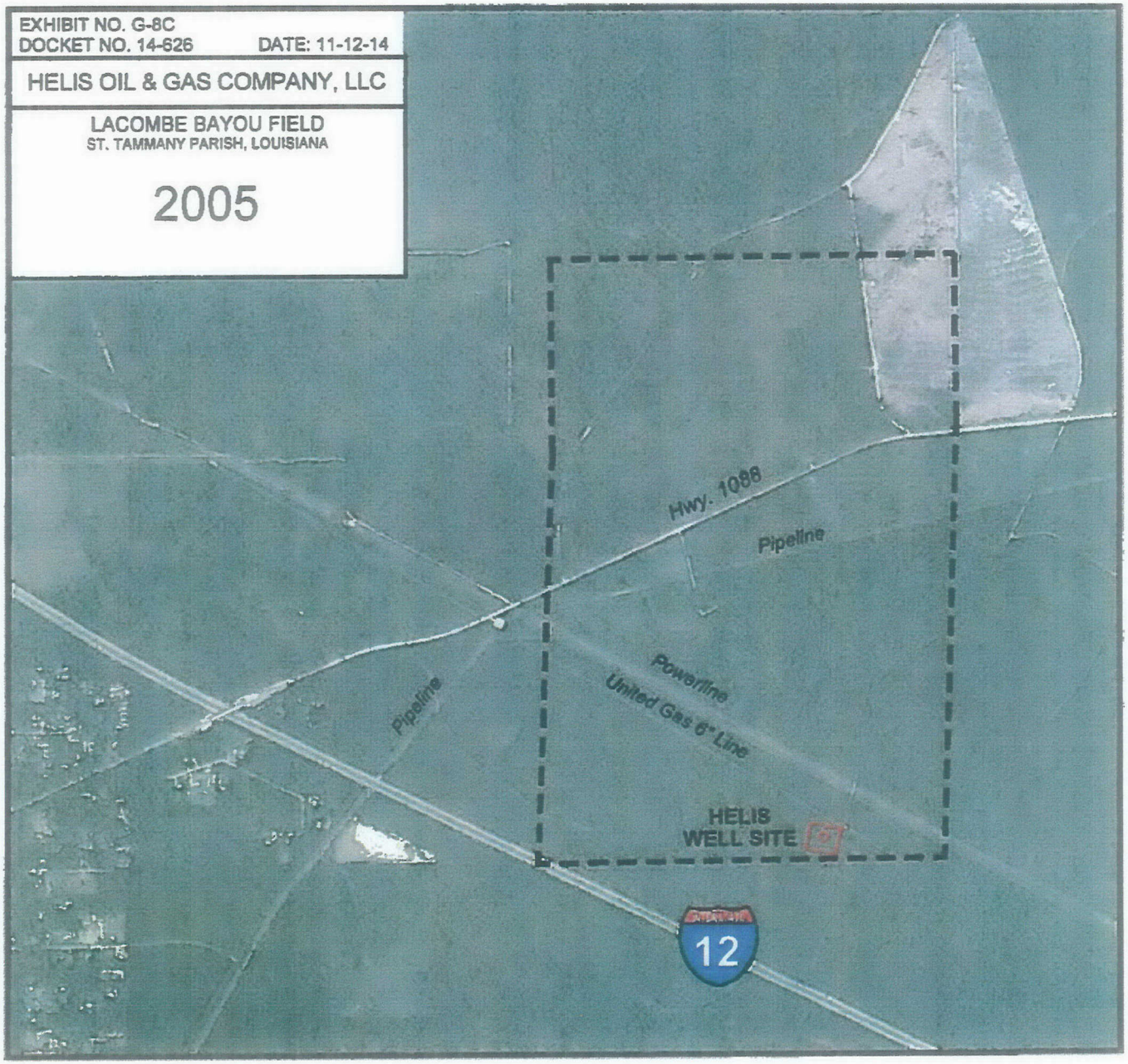
HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

1998



HELIS EXHIBITS (from Hearing)



HELIS EXHIBITS (from Hearing)

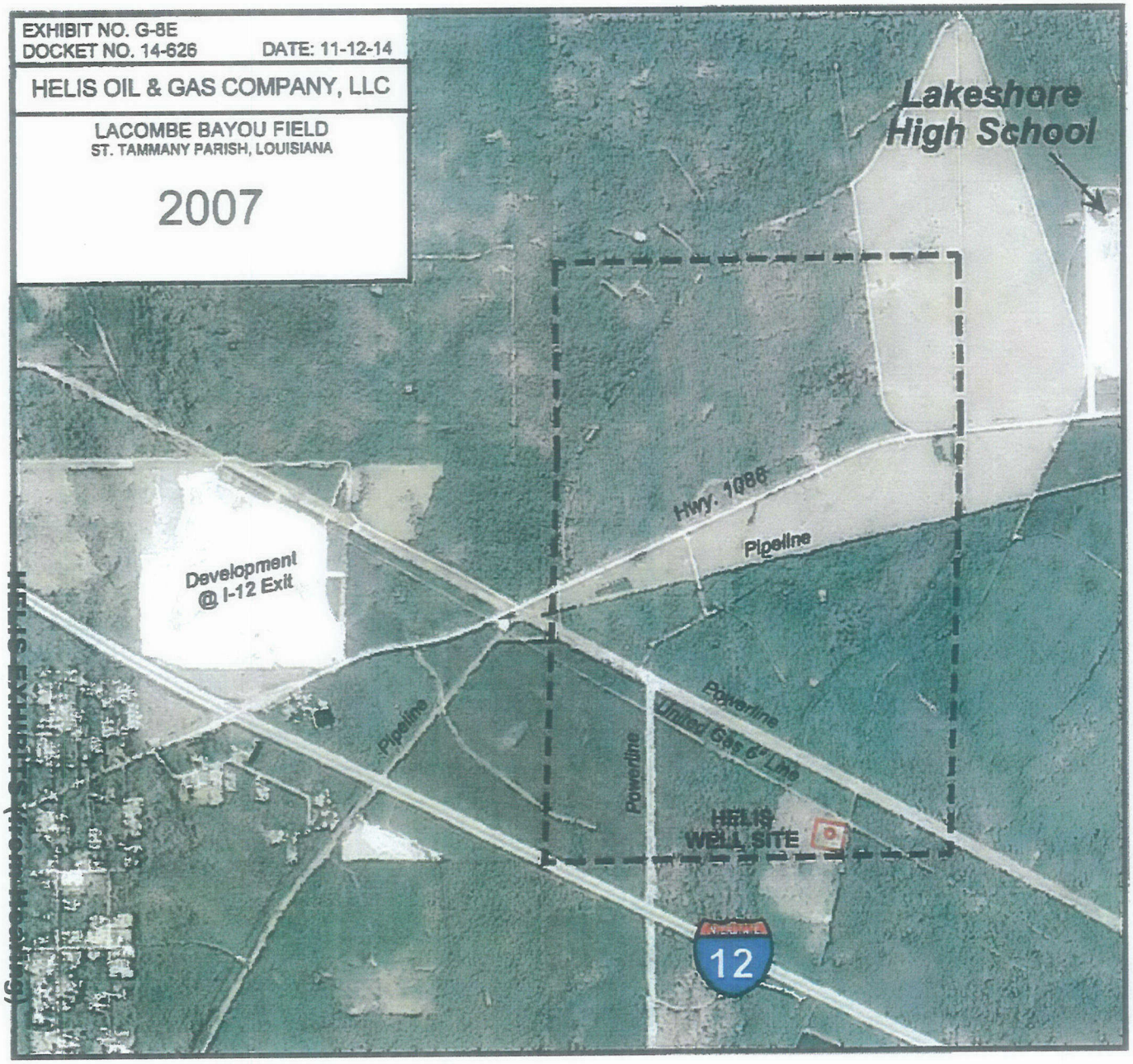
HELIS EXHIBITS (from Hearing)

EXHIBIT NO. G-8E
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

2007



HELIS EXHIBITS (Non-Confidential)

EXHIBIT NO. G-8F
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

2009

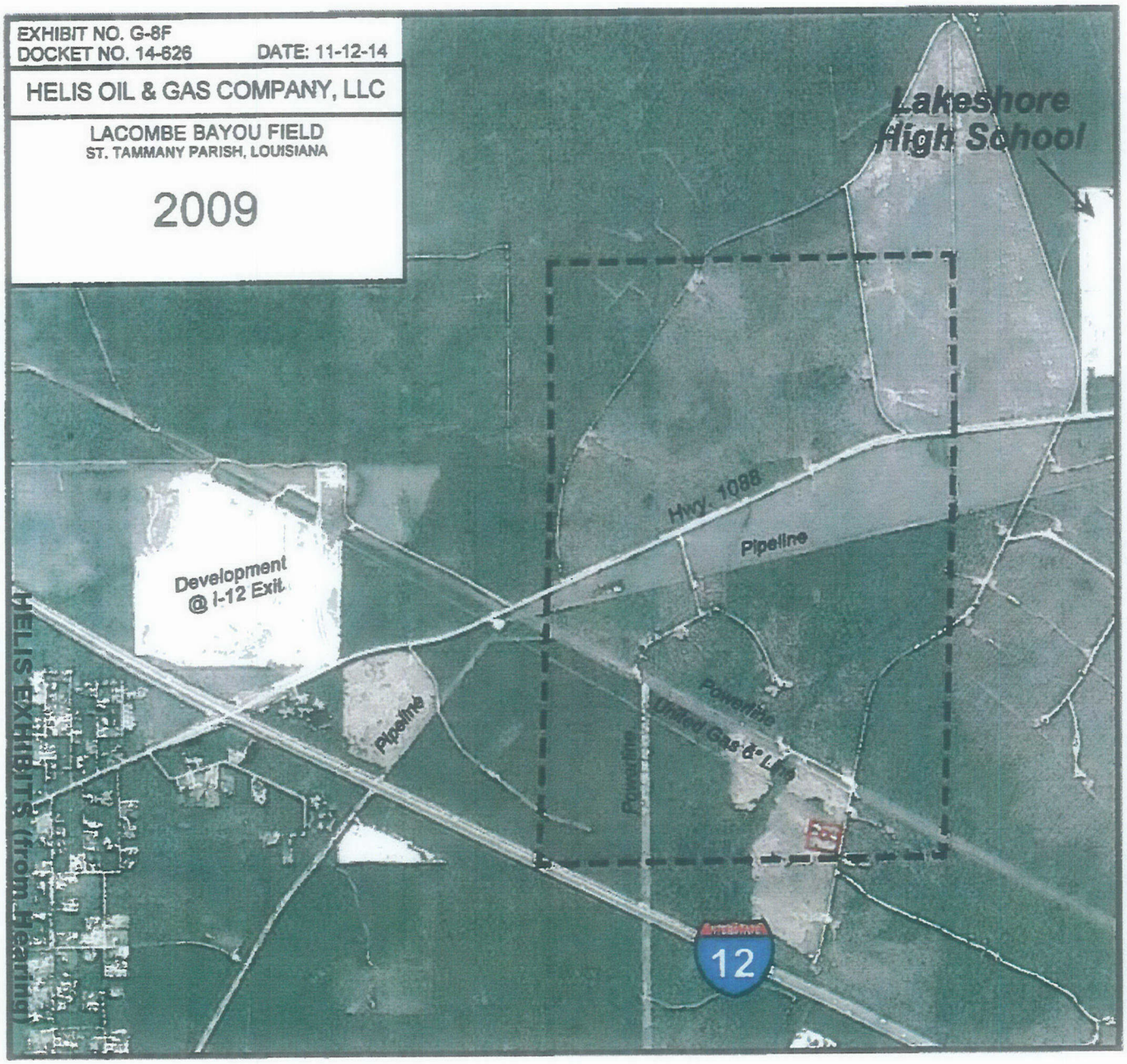


EXHIBIT NO. G-8G
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

2010

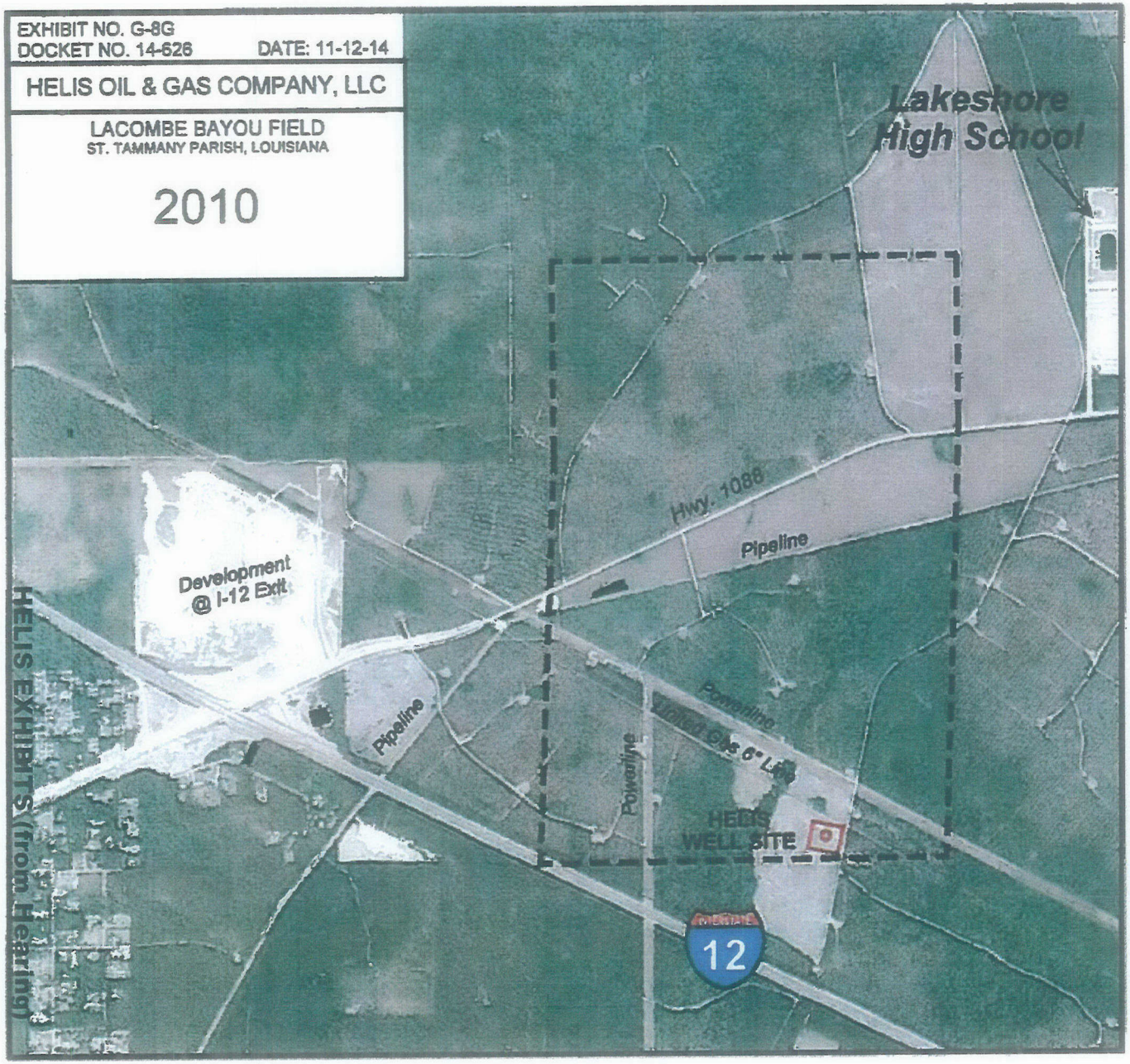


EXHIBIT NO. G-8H
DOCKET NO. 14-626 DATE: 11-12-14

HELIS OIL & GAS COMPANY, LLC

LACOMBE BAYOU FIELD
ST. TAMMANY PARISH, LOUISIANA

2013

Adam T. (Ted) Bourgoyne Jr, P.E.

- BS (1966) & MS (1967) - LSU
- Ph.D. (1969) - University of Texas
- 45 Years Experience
- 29 Years at LSU
- Retired LSU - Dean of Engineering
- 12 Years – Tuscaloosa Trend Wells

Drilling Engineering Review

- Regulatory Requirements for Drilling Permit
- Public Data Available for Wells near Geologic Prospect
- Helis Drilling Permit Application
- Proposed Unit Hearing (Docket No. 14-232) Exhibits
- Helis Drilling Program prepared by Seidel Technologies

Regulatory Requirements for Drilling Permit

- LA Revised Statue 30:28
- Statewide Order 29-B:103

LA Revised Statue 30:28

- Pay Drilling Permit Fee(s)
- Well Location Plat
- Hearing if Structure within 500'
- Commissioner issues Permit
- Commissioner promulgates regulations
  - Surface water quality
  - Ground water aquifer
  - 30 day "Pre-Entry Notice"

Conservation Order 29-B:103

- Application on Form MD-10-R
- Location Plat Requirements
- Pre-Entry Notice
- Affidavit on Form AFLN-1
- Financial Security Requirement

Onshore Oil & Gas Permits, 2014

Month	Permits	TMS Permits
January	165	0
February	119	2
March	94	0
April	100	1
May	122	0
June	159	2
July	121	0
August	89	1

2 TMS Permits issued in September and 2 in October, 2014.

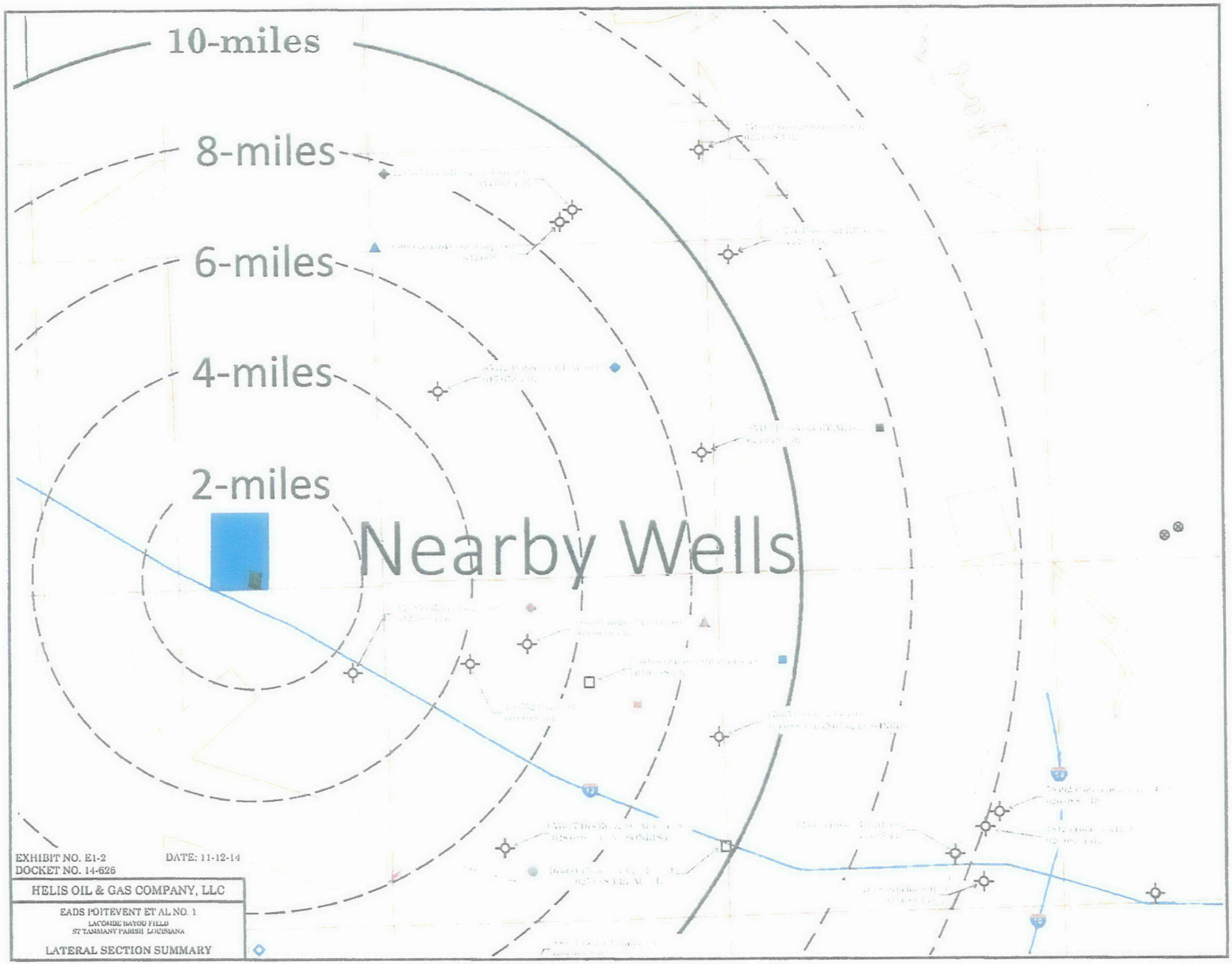
HELIS EXHIBITS (from Hearing)

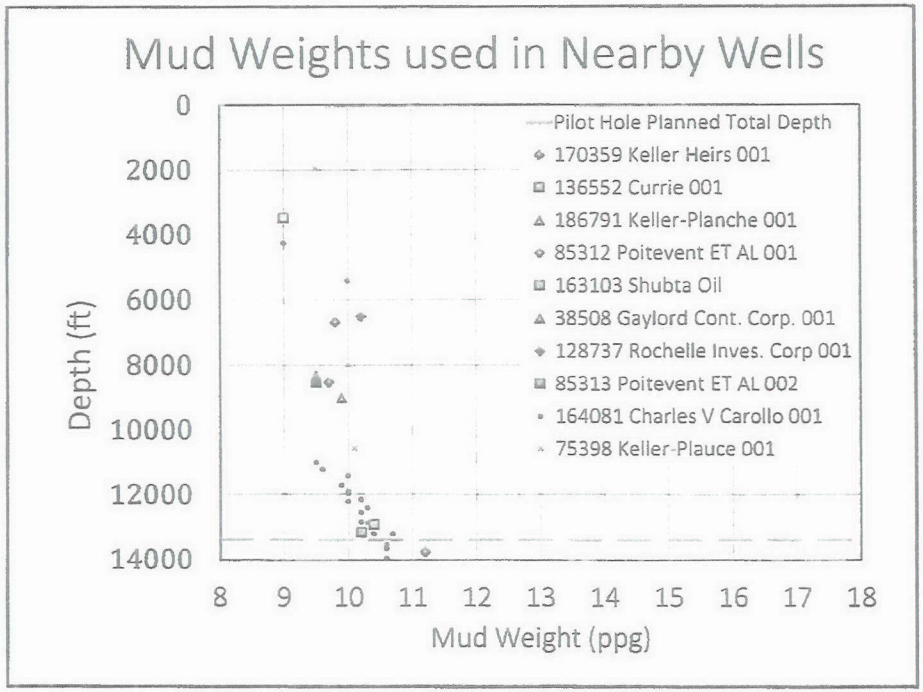
EXHIBIT NO. E1-1 DATE: 11-12-14
DOCKET NO. 14-626

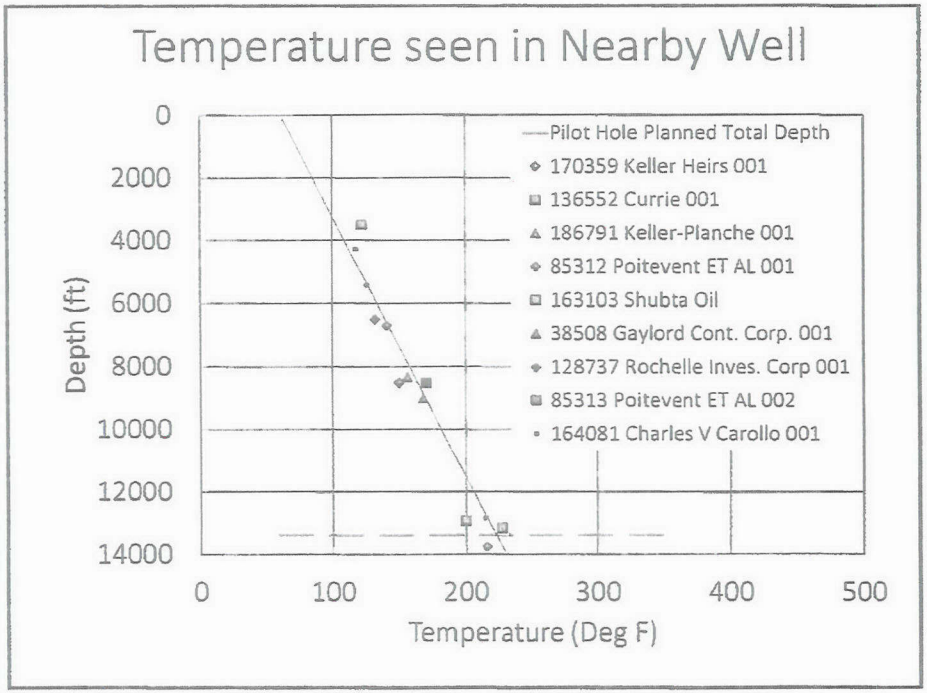
HELIS OIL & GAS COMPANY, LLC

EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH, LOUISIANA

BACKGROUND


10-miles
8-miles
6-miles
4-miles
2-miles
Nearby Wells
EXHIBIT NO. E1-2
DOCKET NO. 14-626
DATE: 11-12-14
HELIS OIL & GAS COMPANY, LLC
EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH LOUISIANA
LATERAL SECTION SUMMARY





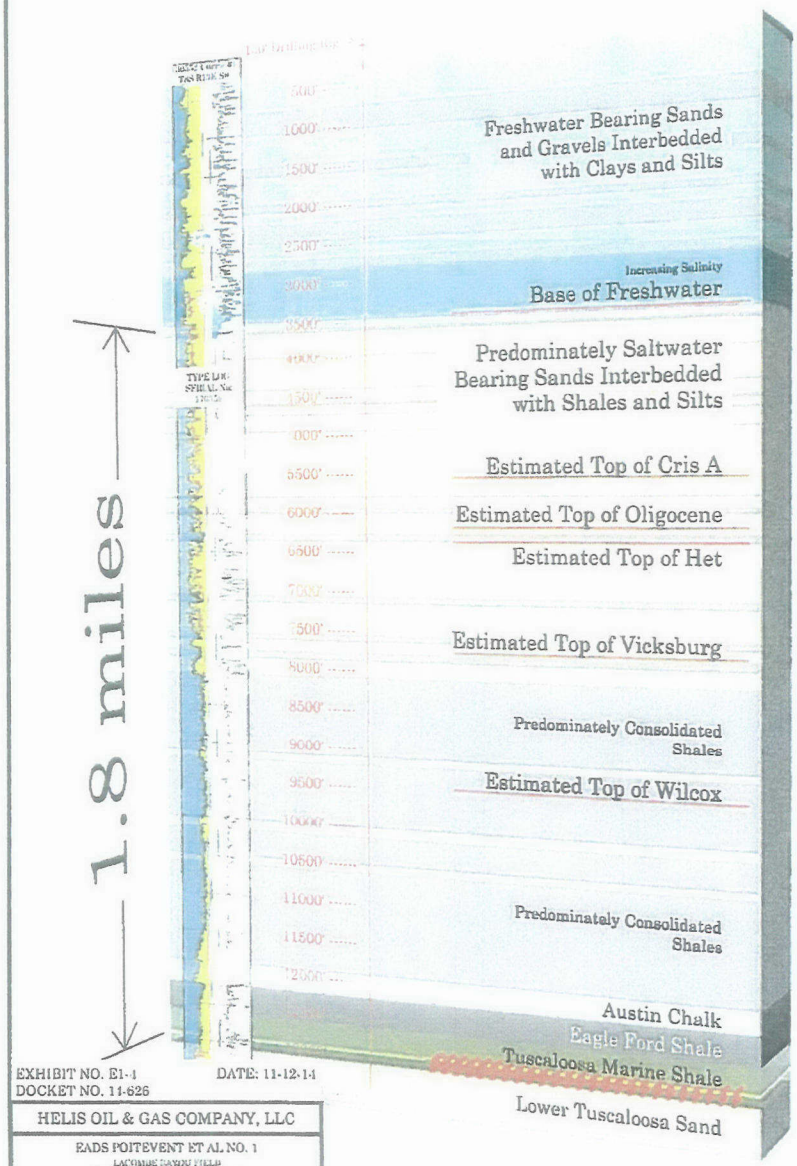
HELIS EXHIBITS (from Hearing)

EXHIBIT NO. E-3 DATE: 11-12-14
DOCKET NO. 14-626

HELIS OIL & GAS COMPANY, LLC

EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH, LOUISIANA

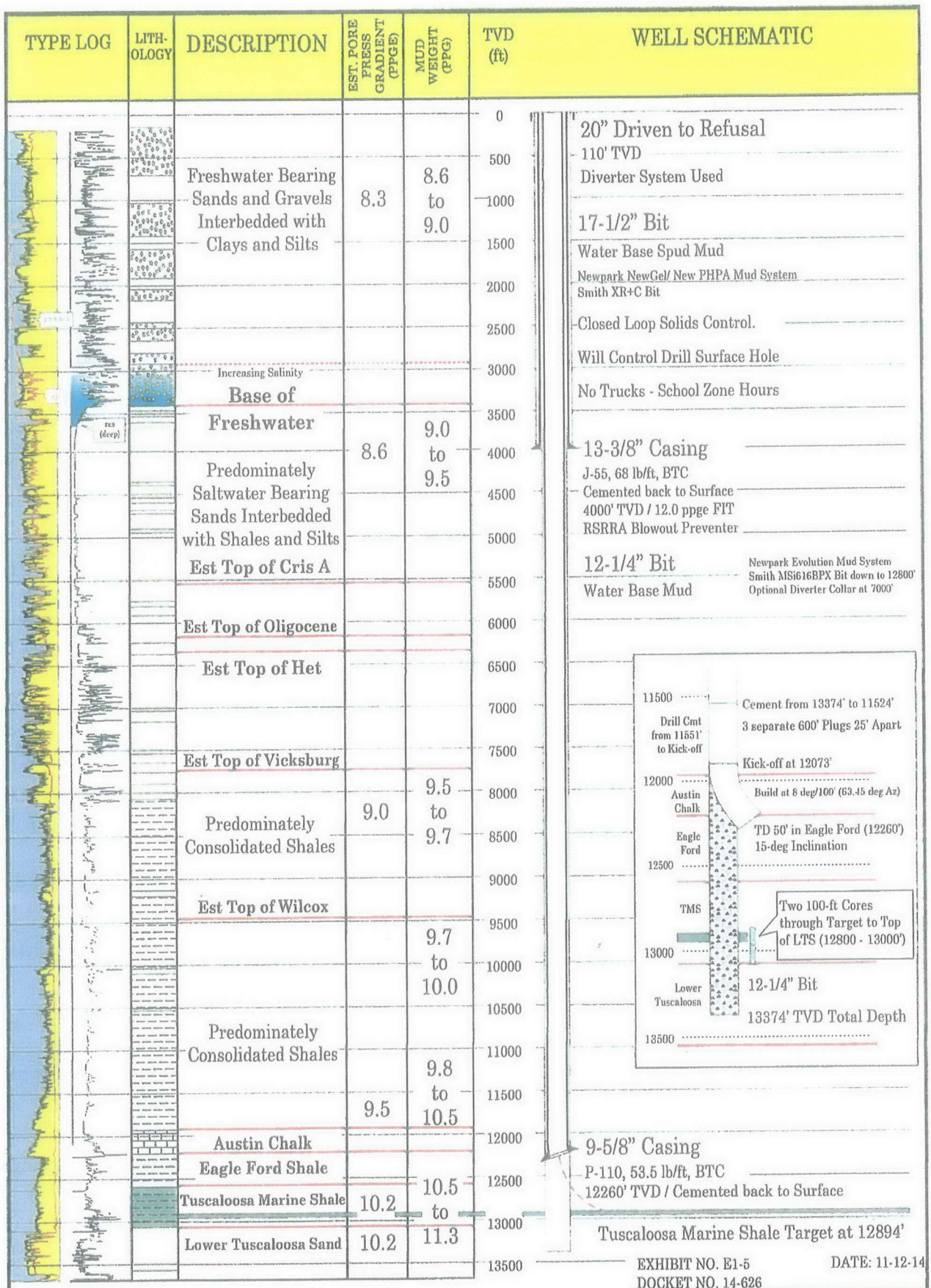
OFFSET MUD WEIGHT AND TEMP DATA



TMS Prospect

- Not High Pressure
- Not High Temperature
- Low Permeability Target
- No Indication of H_2S
- Aquifer protected by 3 Casing Strings
- Target within TMS at 12894'
- 1.8 miles below Aquifers
- About 5000' Lateral
- About 25 Fracture Stages
- Upward Frac Growth easy to detect, easy to stop

HELIS EXHIBITS (from Hearing)



Log Sources:
From 00190' to 03418': Serial No. 136552 / Currie No. 1
From 03418' to 13500': Serial No. 170359 / Keller Heirs No. 1 (TYPE LOG)

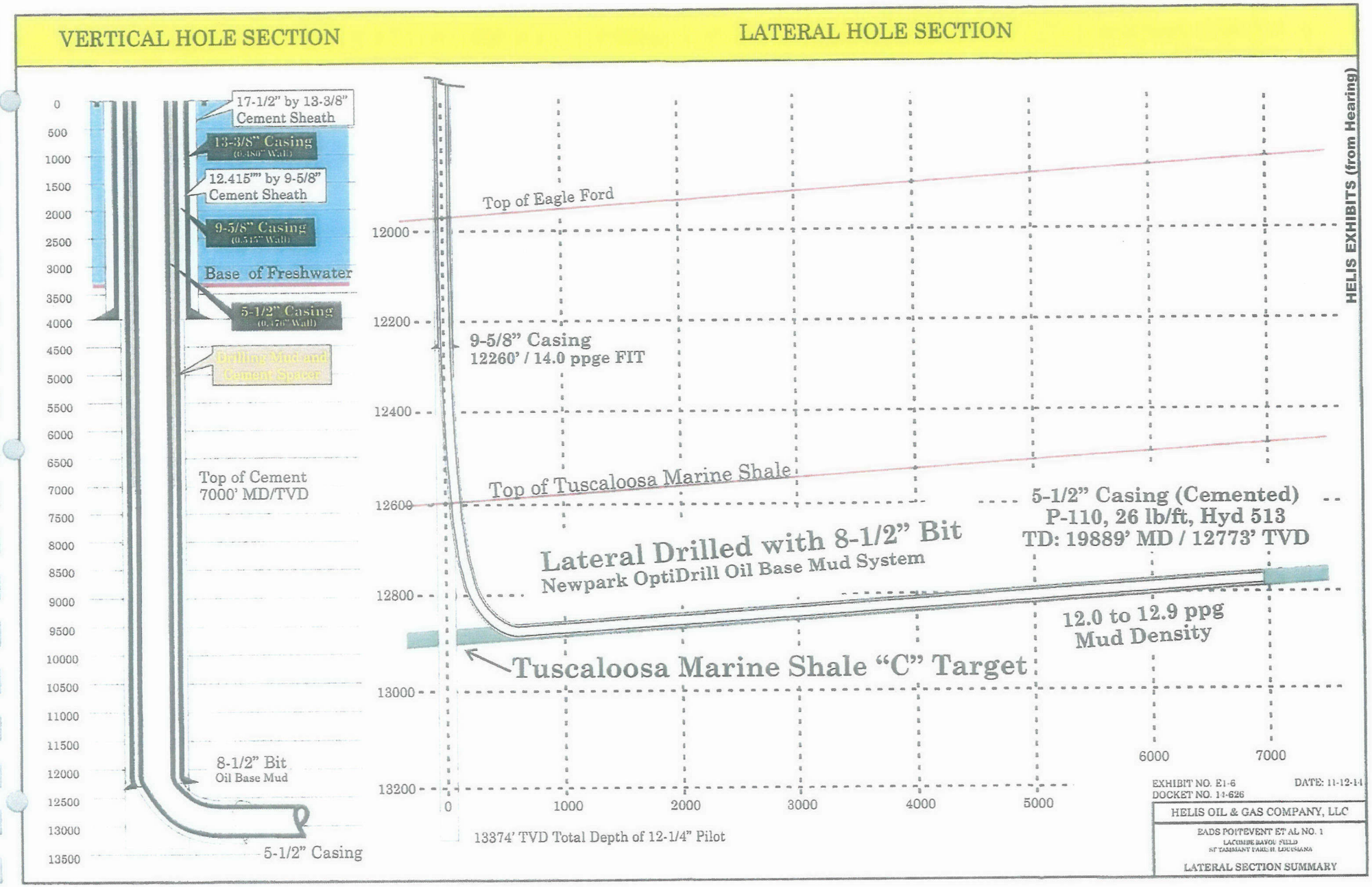
EXHIBIT NO. E1-5 DATE: 11-12-14
DOCKET NO. 14-626

HELIS OIL & GAS COMPANY, LLC

EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH, LOUISIANA

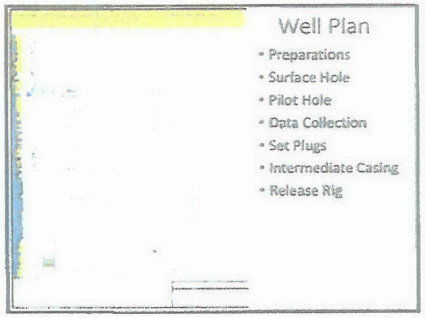
WELL PLAN SUMMARY

HELIS EXHIBITS (from Hearing)


VERTICAL HOLE SECTION
LATERAL HOLE SECTION
17-1/2" by 13-3/8" Cement Sheath
13-3/8" Casing
12.415"" by 9-5/8" Cement Sheath
9-5/8" Casing
Base of Freshwater
5-1/2" Casing
Drilling Mud and Cement Spacer
Top of Cement 7000' MD/TVD
8-1/2" Bit
Oil Base Mud
5-1/2" Casing
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
9500
10000
10500
11000
11500
12000
12500
13000
13500
Top of Eagle Ford
9-5/8" Casing
12260' / 14.0 ppge FIT
Top of Tuscaloosa Marine Shale
5-1/2" Casing (Cemented)
P-110, 26 lb/ft, Hyd 513
TD: 19889' MD / 12773' TVD
Lateral Drilled with 8-1/2" Bit
Newpark OptiDrill Oil Base Mud System
12.0 to 12.9 ppg Mud Density
Tuscaloosa Marine Shale "C" Target
12000
12200
12400
12600
12800
13000
13200
0
1000
2000
3000
4000
5000
6000
7000
13374' TVD Total Depth of 12-1/4" Pilot
HELIS EXHIBITS (from Hearing)
EXHIBIT NO. E1-6
DOCKET NO. 14-626
DATE: 11-12-14
HELIS OIL & GAS COMPANY, LLC
EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH, LOUISIANA
LATERAL SECTION SUMMARY

Conclusions

- Helis has met Permit Requirements of 29B.
- Helis has operated in Louisiana for over 80 Years.
- Well Plan is based on Safe, Time-tested Drilling Practices and Best Available Technology for Protecting the Environment.
- Helis Well Planning and H-INC Contractor Audit Safety and Environmental Management System (SEMS) is designed to meet or exceed Requirements for Federal Leases.
- Helis has considerable Drilling Experience and has drilled similar Shale Prospect Wells in U.S.



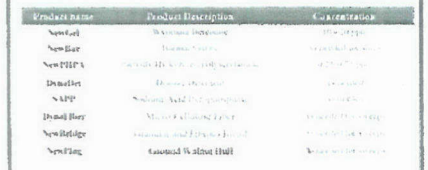
Preparations to Drill

- Prepare 3.21 Acre Surface Location
- Drive 20", 106.5 lb/ft Conductor to ~110'.
- Move in Rig Equipment
- Install & Inspect 20" Diverter System
- Pre-Spud Meetings
  - Drilling Program
  - Emergency Plan
  - Hurricane Plan
  - Trucking Plan
  - Well Control Training Refresher Plan

Surface Hole

- Control Drill 17.5" hole to ~4000'.
- Run ~4000' of 13.375" Surface Casing.
- Cement Surface Casing to Surface.
- Wait on Cement 8 hrs.
- Nipple up & Test 13.625" BOP System.
- P/U 12.25" Bit & RIH & tag Cement.
- Drill out Cement to Float Collar.
- Pressure Test Casing to 1500 psi.

Drilling Fluid for Surface Hole ~ 95% Fresh Water



Pilot Hole to Evaluate TMS

- Drill Casing Shoe & 10' New Formation.
- Perform FIT to 12.0 ppg EMW.
- Drill ahead; Start Mud Log at ~5000.'
- Drill to Core Point (~12,800').
- Take two 100' Cores.
- P/U 12.25" Bit and BHA.
- RIH and drill to TD at ~13,374.'

Gather Petrophysical Data

- Make Wiper Trip; Condition hole.
- Run 1: Quad Combo.
- Run 2: FMI and Sonic Scanner.
- Make Wiper Trip; Condition hole.
- Run 3: MDT for Pressure & Fluid.
- Run 4: Take 60 Sidewall Cores.

Plug Pilot Hole

- Pick up Tubing Stinger; RIH to 13,374'.
- Set 600' Balanced 16.4 ppg Cement Plug.
- Pull Stinger 25' above Cement; Circulate 1.5 hole volumes.
- Set 600' Balanced 17.2 ppg Cement Plug.
- Pull Stinger 25' above Cement; Circulate 1.5 hole volumes.
- Set 600' Balanced 17.2 ppg Cement Plug.
- Pull Stinger 300' above Cement. Circulate 1.5 hole volumes.
- Wait on Cement 24 hrs.; POOH to Surface.

Review Results of Preliminary Petrophysical Analysis

- If Prospect not Viable, Submit Plan & Obtain Approval to Plug and Abandon Well.
- If Prospect Warrants further Analysis, Run Intermediate Casing.

HELIS EXHIBITS (from Hearing)

EXHIBIT NO. E1-7 DATE: 11-12-14
DOCKET NO. 14-626

HELIS OIL & GAS COMPANY, LLC

EADS POITEVENT ET AL. NO. 1
LACOMBE, BAYOU HELIS
ST TAMMANY PARISH, LOUISIANA

CONCLUSIONS & ADDITIONAL MATERIAL

Run Intermediate Casing

- Pick up 12-1/4" Bit and BHA.
- Dress off cement to KOP at ~12,073.'
- Pick up 12-1/4" directional BHA and RIH.
- Kick off at 8°/100' to TD at 15° Inclination & 63.45°Azimuth; Be 50' into the Eagle Ford Shale at ~12,260'MD/12,258' TVD.
- Make Wiper Trip; Condition Hole; POOH.
- Run 12,260' of 9-5/8" Casing.

Cement Casing & Release Rig

- Cement Casing to Surface.
- Wait on Cement 24 Hours.
- Nipple down Blowout Preventer and Nipple up Temporary Abandonment Tree.
- Release and Move out Rig.

Detailed Prospect Evaluation

- Well Log Analyses
- Lab Analyses of Rock Samples
- Lab Analyses of Fluid Samples
- Detailed design of Frac Job
- Future Production Estimates
- Finalize Phase 2 Well Plan

Prepare to Drill Lateral

- Move in Rig
- ND Tree; NU & Test BOP Stack
- PU 8.5"Bit & BHA; Drill cement to FC
- Displace WBM with Oil Base Mud
- Pressure test Casing to 2700 psi
- Run Cement Bond Log
- Drill out Shoe & 10' New Formation
- Perform FIT to 14 ppg EMW

Drill Lateral & Run Casing

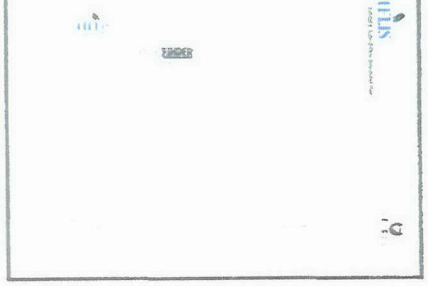
- Drill Lateral as per Directional Plan
- Drill to 19,885' MD/12,773 TVD
- Clean and Condition Hole
- Run 5 1/2" Production Casing to TD
- Cement Casing with TOC at 7000
- Run Cement Bond Log.
- ND BOP; NU Tree, Release Rig

Perform Fracture Stimulation

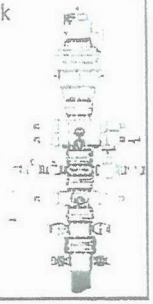
- Move in and Rig up Frac Equipment
- Pressure Test Lines and Equipment.
- Perform 25 Stage Frac Treatment.
  - Perforate
  - Pump Frac Fluid & Proppant for Stage
  - Set Plug
  - Repeat 25 times
- RD & Release Frac Equipment

Perform Flowback Test

- Move in and RU Coil Tubing.
- Move in & Rig up Well Test Service.
- Drill out Plugs.
- Release Coil Tubing.
- Test Well.
- Release Well Test Service.



BOP Stack



Auxiliary Equipment to be Used (10,000 psi System)

Blowout Preventer Equipment Testing

- The wellhead BOP equipment will be tripped up on the 13 5/8" 10,000 psi WP casing head prior to drilling out from under surface casing.
- All ram preventers and related equipment will be tested to 10,000 psi for 10 minutes
- Annular preventers will be tested to 70% of rated working pressure for 10 minutes
- Surface casing will be tested to 1500psi for 30 min with no more than 10% pressure loss in 10 minutes.
- All preventers and surface casing will be tested before drilling out of surface casing
- BOP equipment will be visually inspected daily and tested within 14 days of previous test, and after any repairs are made to the BOP equipment.
- Annular preventers will be functionally operated at least once per week. Pipe rams will be activated daily and blind rams shall be activated each trip or at least weekly.
- Notified regulatory agency 24 hours in advance of testing of BOPE
- Record name of government personnel contacted and time & date of notification on reports

HELIS EXHIBITS (from Hearing)

EXHIBIT NO. E1-8 DATE: 11-12-14
DOCKET NO. 14-626

HELIS OIL & GAS COMPANY, LLC

EADS POITEVENT ET AL NO. 1
LACOMBE BAYOU FIELD
ST TAMMANY PARISH, LOUISIANA

ADDITIONAL MATERIALS

GSI Environmental Inc. Expert

John A. Connor, P.E., P.G., B.C.E.E.

- **Education:**
  B.A., Stanford University
  M.S., Stanford University

- **General Experience:**
  34 years, focus in environmental investigation, groundwater protection, risk assessment, remediation, oil and gas operations.

- **Oilfield Experience:**
  Environmental audits, risk assessment, technical guidance documents, environmental research and development studies, remediation methods and costs.

HELIS EXHIBITS (from Hearing)

E2 1

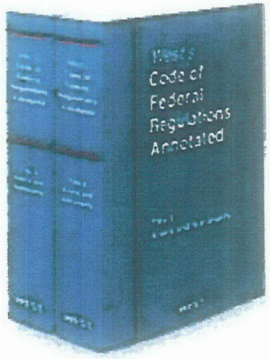
Environmental Issues Reviewed

- Considerations for site selection
- Groundwater protection
- Water use
- Spill prevention/stormwater management
- Ecology and wetlands
- Air monitoring
- Emergency response
- Miscellaneous: noise, traffic, etc.

HELIS EXHIBITS (from Hearing)

Relevant Regulations and Technical Guidelines

- **Louisiana Administrative Code**
  - Title 33, 43 (29-B)



- **Code of Federal Regulations**
  - Title 29, 33, 40

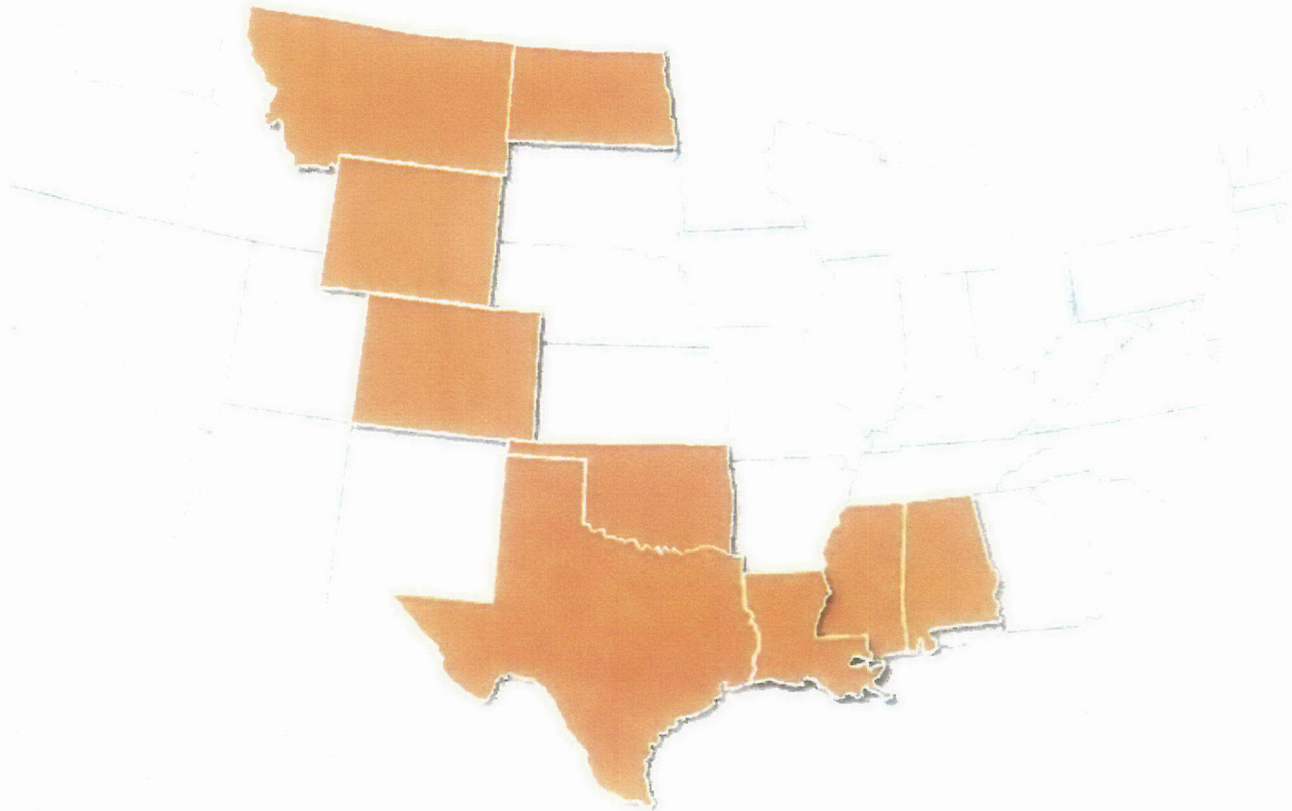
- **American Petroleum Institute Guidance on Hydraulic Fracturing**

HELIS EXHIBITS (from Hearing)

Environmental Engineering Review

- Helis' Operational History
- Water Supply
- Chemical Disclosure
- Groundwater Protection
- Waste Management and Other Environmental Issues

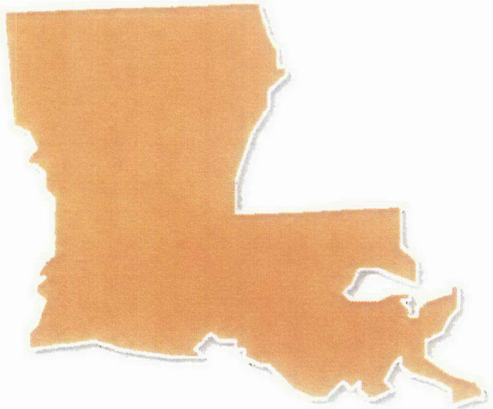
Helis' Operational History



Helis has drilled over 650 wells in the U.S.

HELIS EXHIBITS (from Hearing)

Helis' Operational History

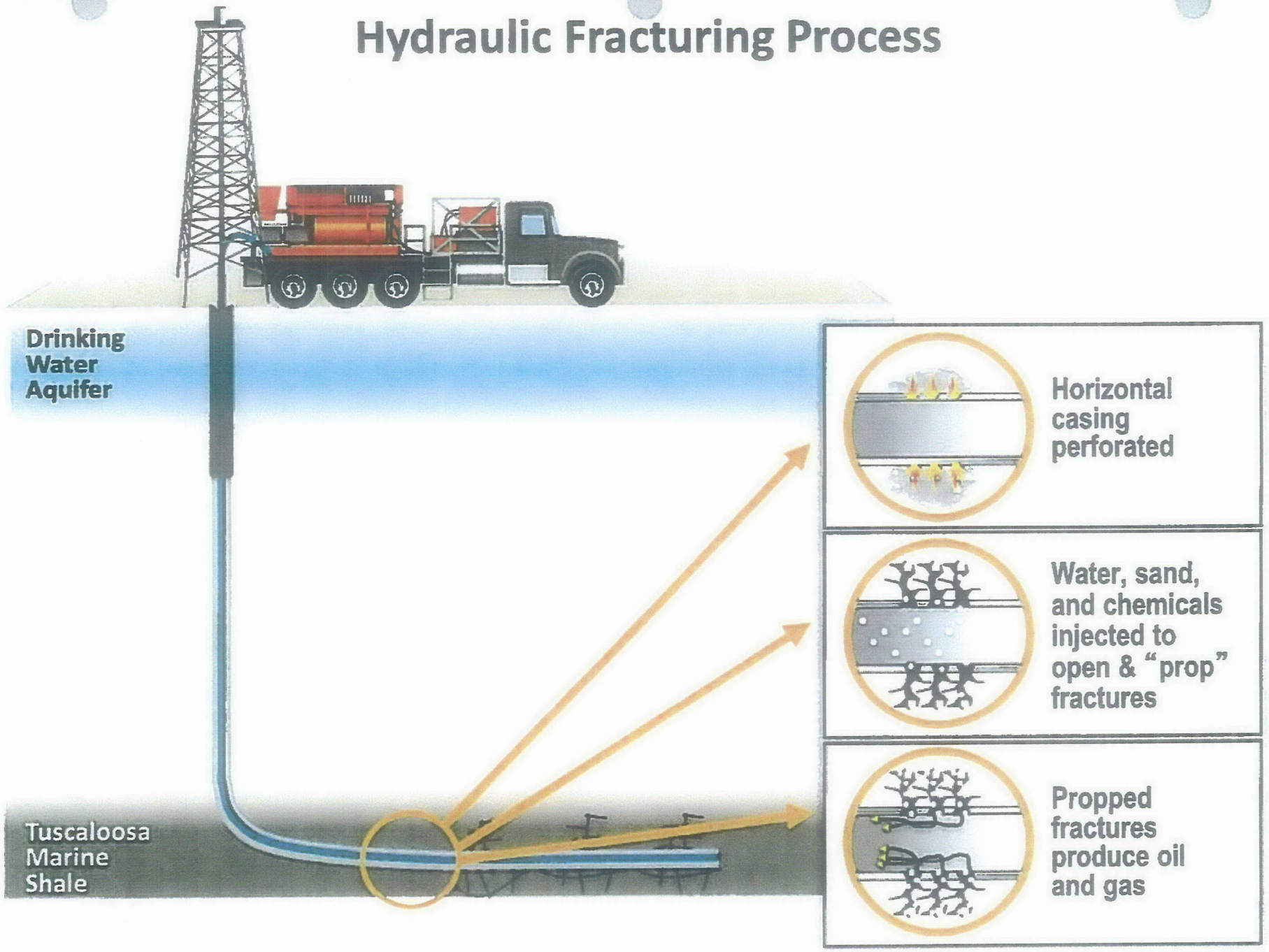


- Louisiana company, founded **80** years ago
- Helis currently operates over **100** wells in Louisiana
- Over **900** regulatory inspections, since 2006 alone
- Only 11 issues, none environmental - all resolved

Helis has drilled over 650 wells in the U.S.

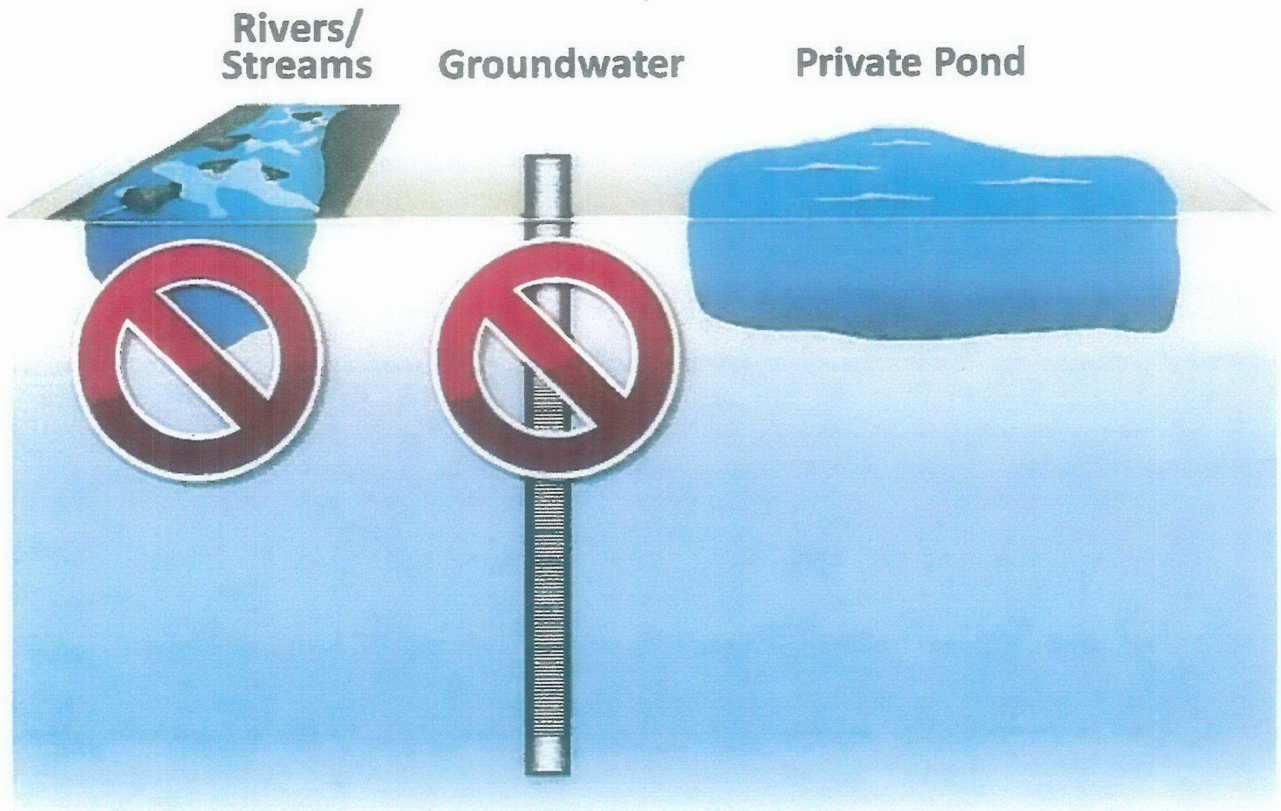
HELIS EXHIBITS (from Hearing)

Hydraulic Fracturing Process



HELIS EXHIBITS (from Hearing)

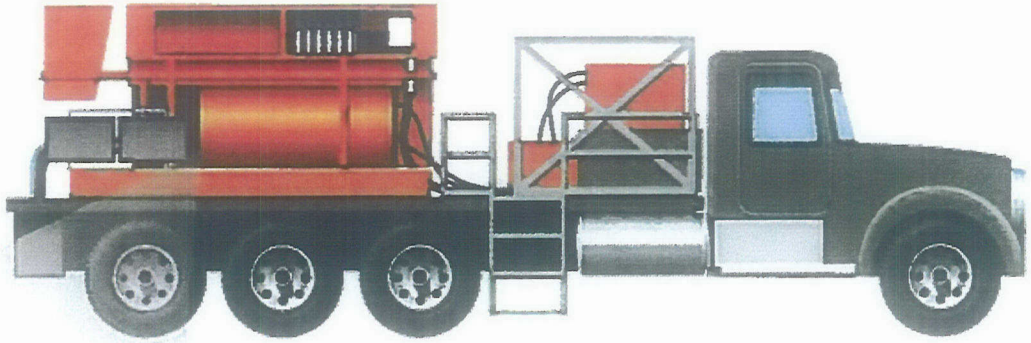
Where Will Helis Get Their Water For This Site?

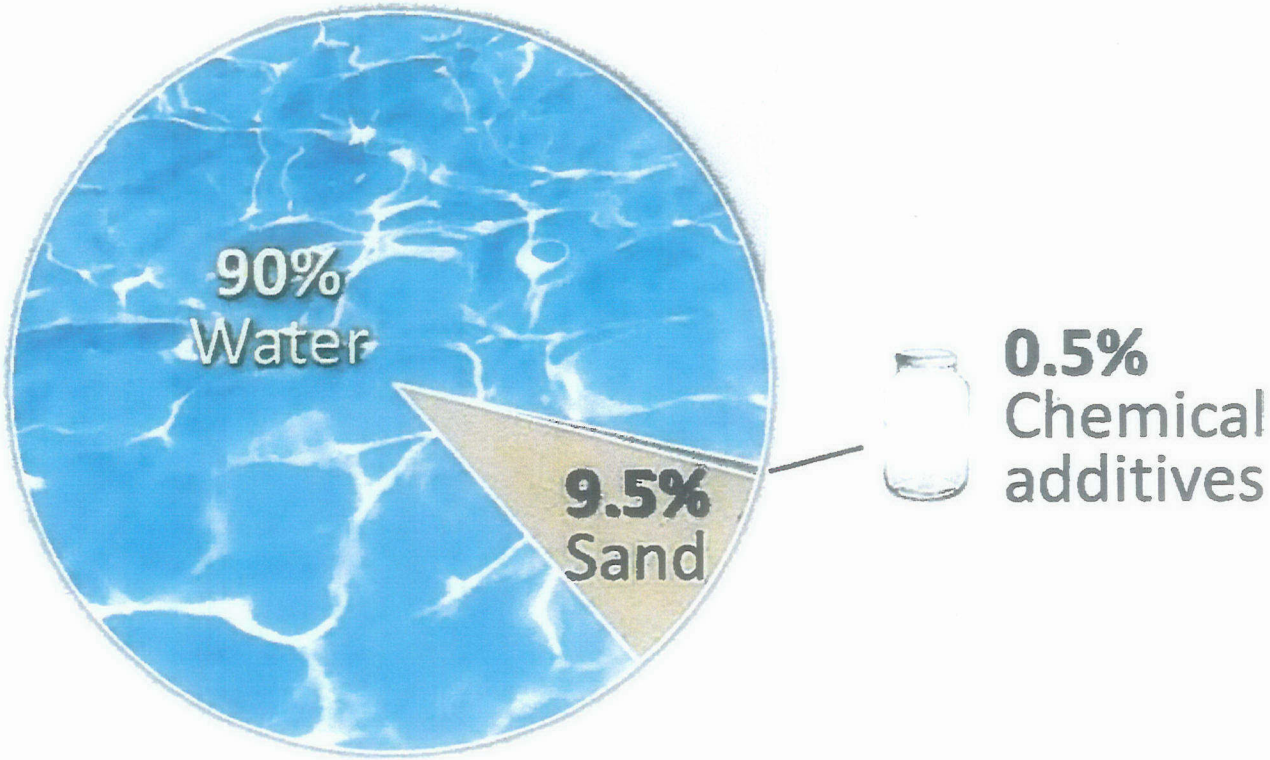


- For this well, Helis will use water from private ponds
- Nearest scenic stream (Cane Bayou) is approximately 0.9 miles away – will not be used

HELIS EXHIBITS (from Hearing)

What Is In The Hydraulic Fracturing Mixture?

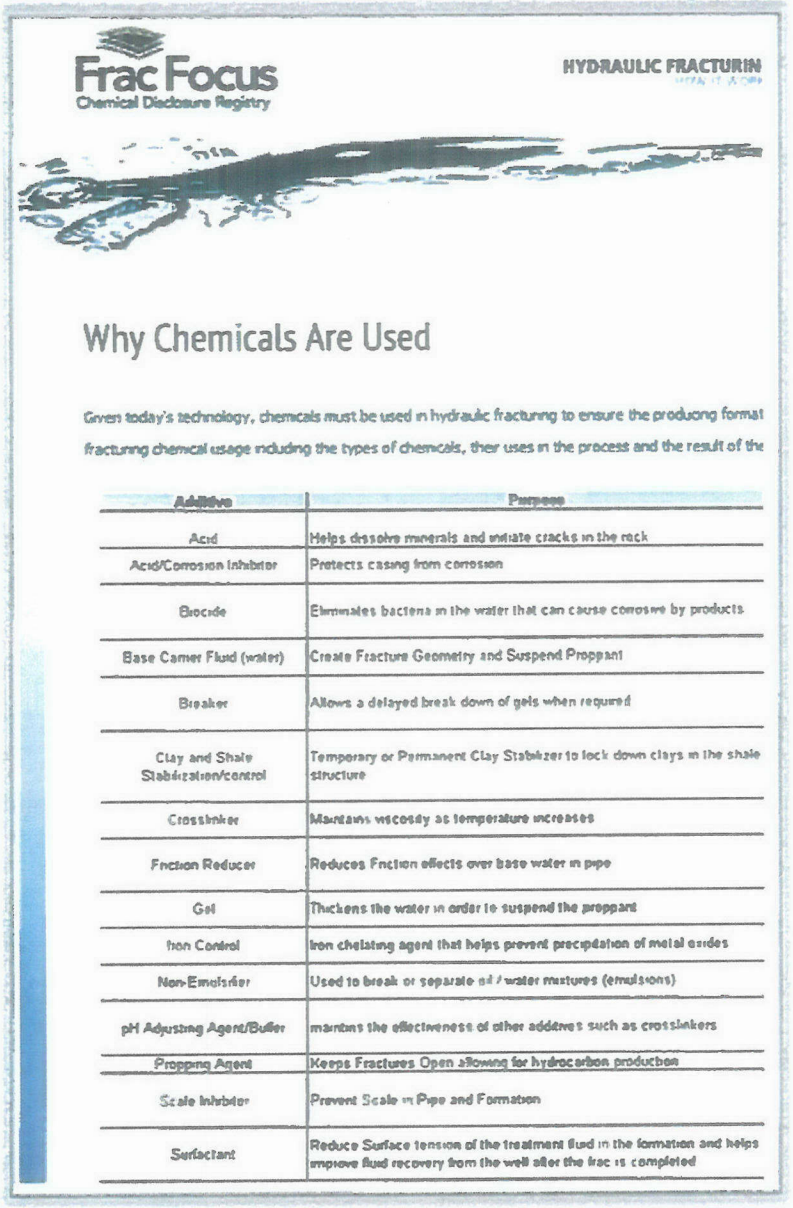




Source: API, 2014. Hydraulic Fracturing: Unlocking America's Natural Gas Resources

HELIS EXHIBITS (from Hearing)

What Are These Chemical Additives?



Frac Focus
Chemical Disclosure Registry

HYDRAULIC FRACTURIN

Why Chemicals Are Used

Given today's technology, chemicals must be used in hydraulic fracturing to ensure the producing format
fracturing chemical usage including the types of chemicals, their uses in the process and the result of the

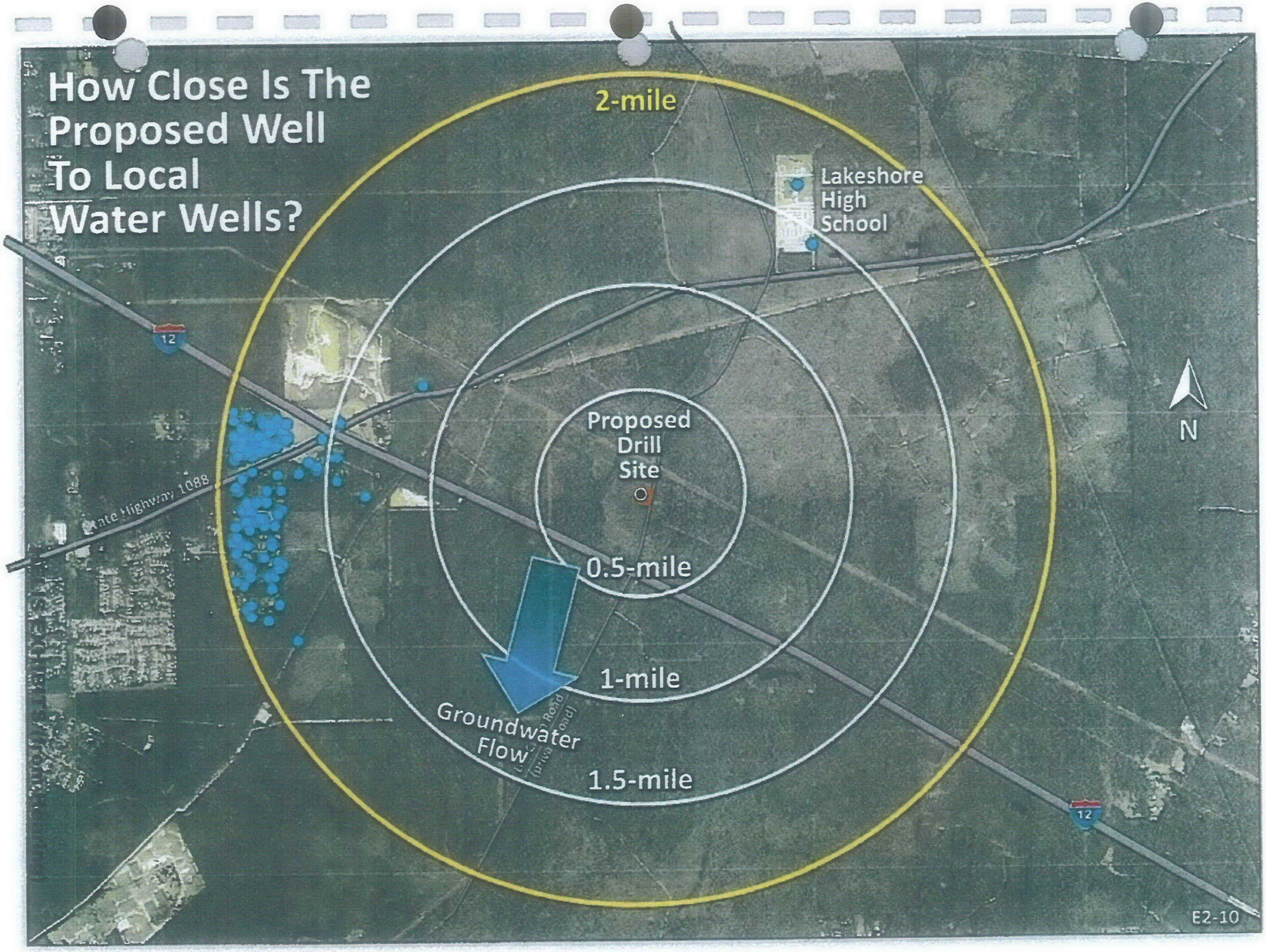
Additive	Purpose
Acid	Helps dissolve minerals and initiate cracks in the rock
Acid/Corrosion Inhibitor	Protects casing from corrosion
Biocide	Eliminates bacteria in the water that can cause corrosive by products
Base Carrier Fluid (water)	Create Fracture Geometry and Suspend Proppant
Breaker	Allows a delayed break down of gels when required
Clay and Shale Stabilization/control	Temporary or Permanent Clay Stabilizer to lock down clays in the shale structure
Crosslinker	Maintains viscosity as temperature increases
Friction Reducer	Reduces Friction effects over base water in pipe
Gel	Thickens the water in order to suspend the proppant
Iron Control	Iron chelating agent that helps prevent precipitation of metal oxides
Non-Emulsifier	Used to break or separate oil / water mixtures (emulsions)
pH Adjusting Agent/Buffer	maintains the effectiveness of other additives such as crosslinkers
Propping Agent	Keeps Fractures Open allowing for hydrocarbon production
Scale Inhibitor	Prevent Scale in Pipe and Formation
Surfactant	Reduce Surface tension of the treatment fluid in the formation and helps improve fluid recovery from the well after the frac is completed

- Chemicals used at each site vary.
- Helis will disclose chemicals used at this site on **Frac Focus**.
- Helis' chemical disclosure policy: *Full disclosure without trade secrets.*

Frac Focus
Chemical Disclosure Registry

http://fracfocus.org/

HELIS EXHIBITS (from Hearing)


How Close Is The Proposed Well To Local Water Wells?
2-mile
Lakeshore High School
Proposed Drill Site
0.5-mile
1-mile
1.5-mile
Groundwater Flow
N
E2-10

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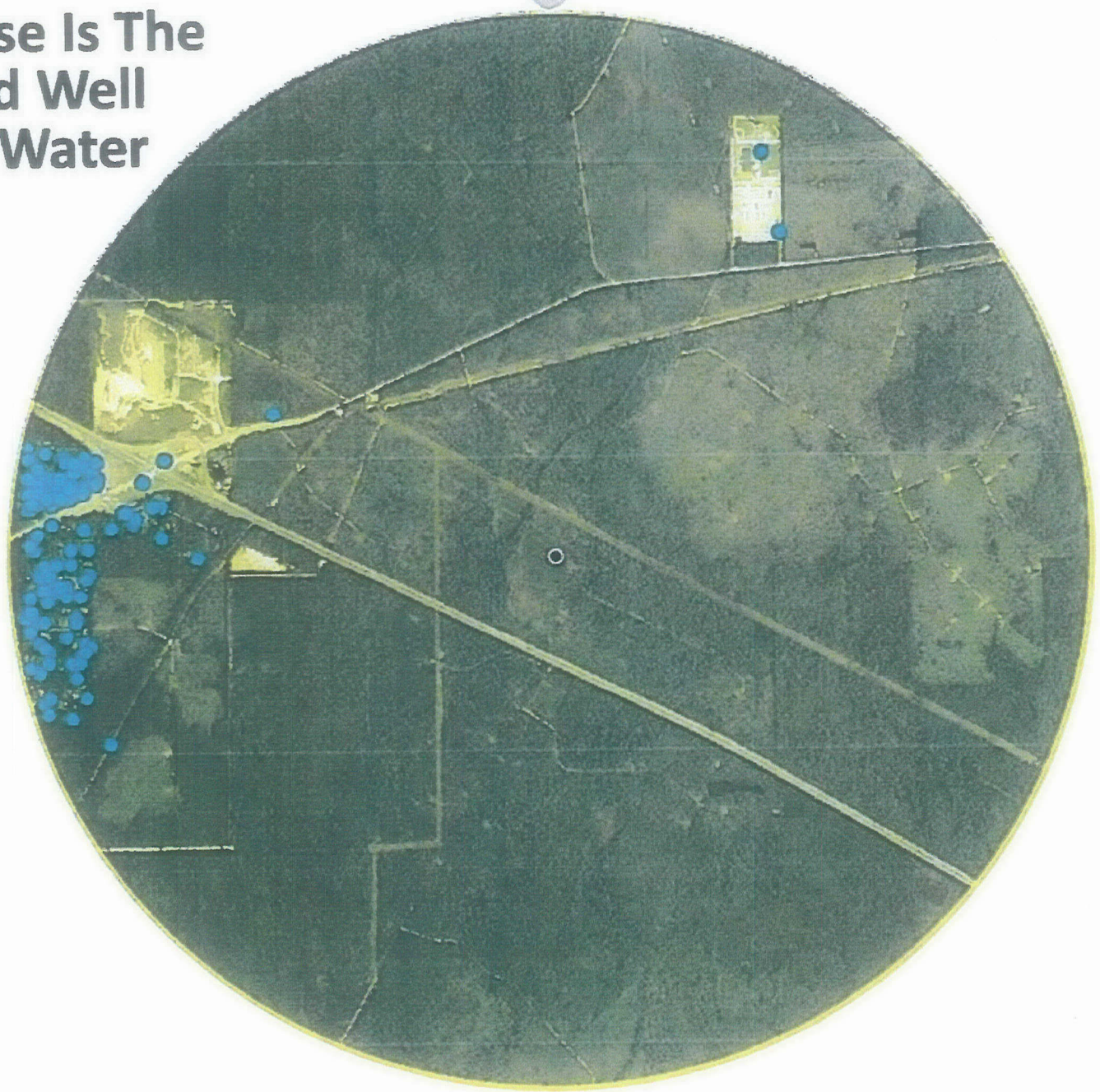

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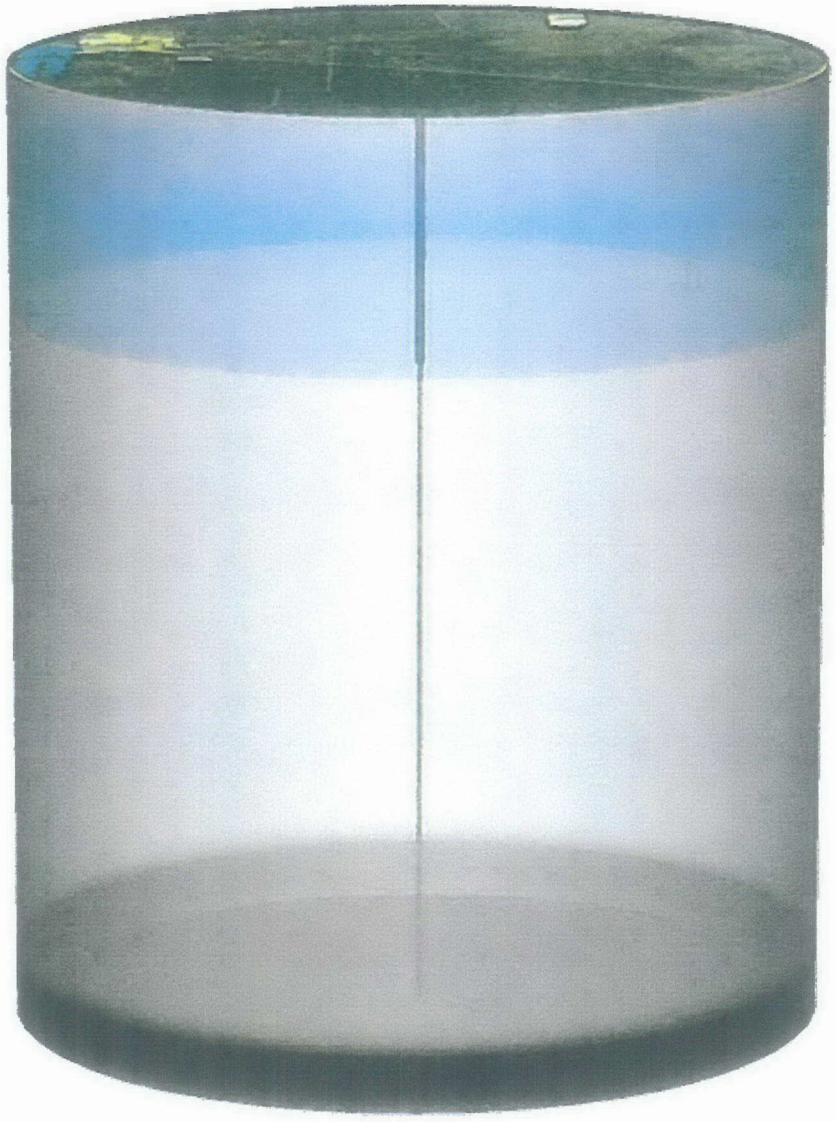

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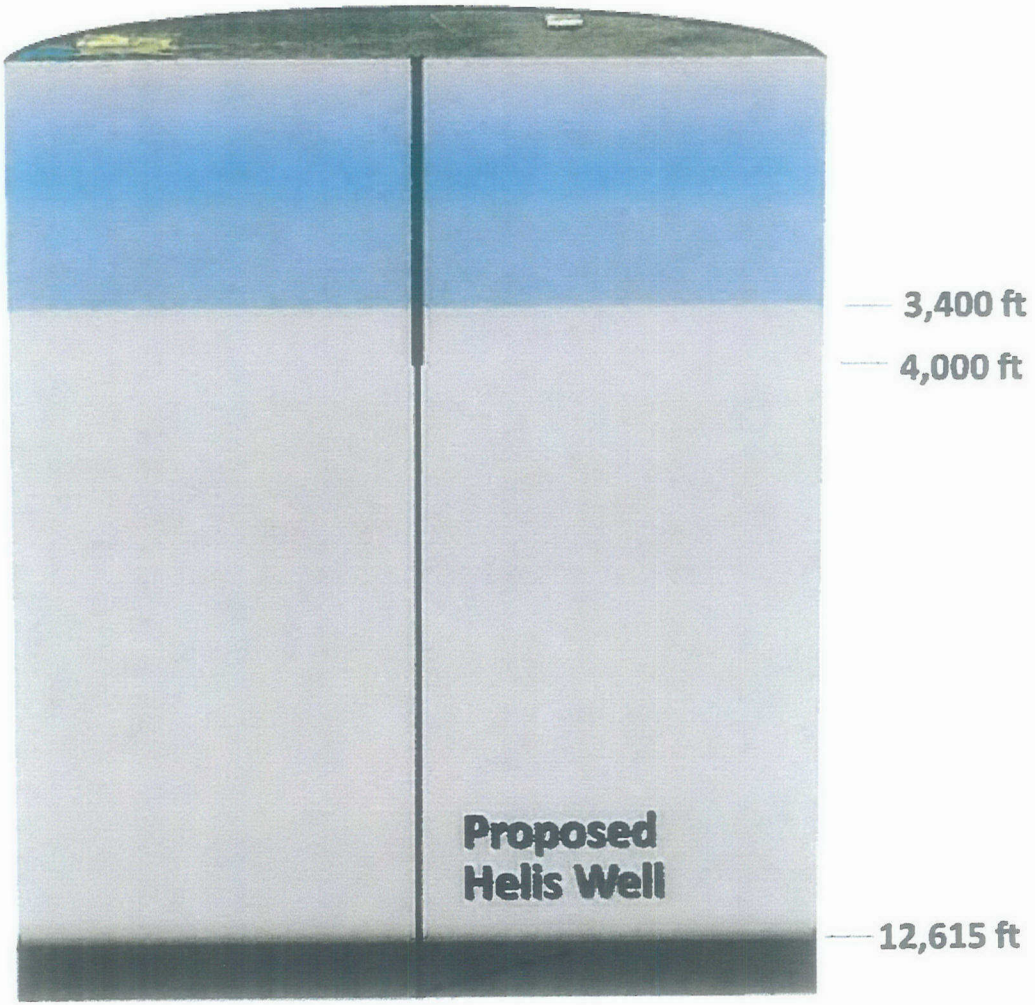

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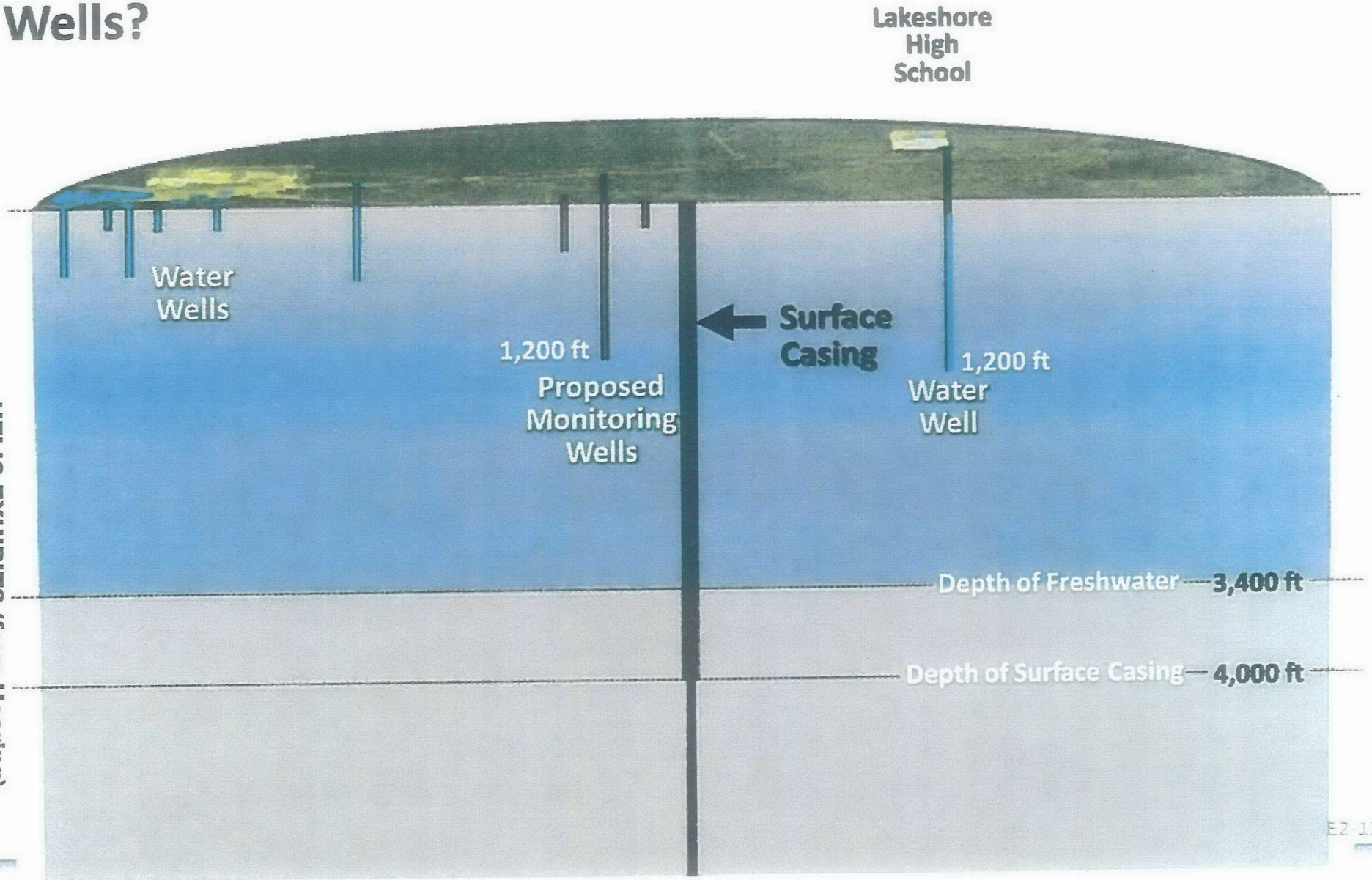
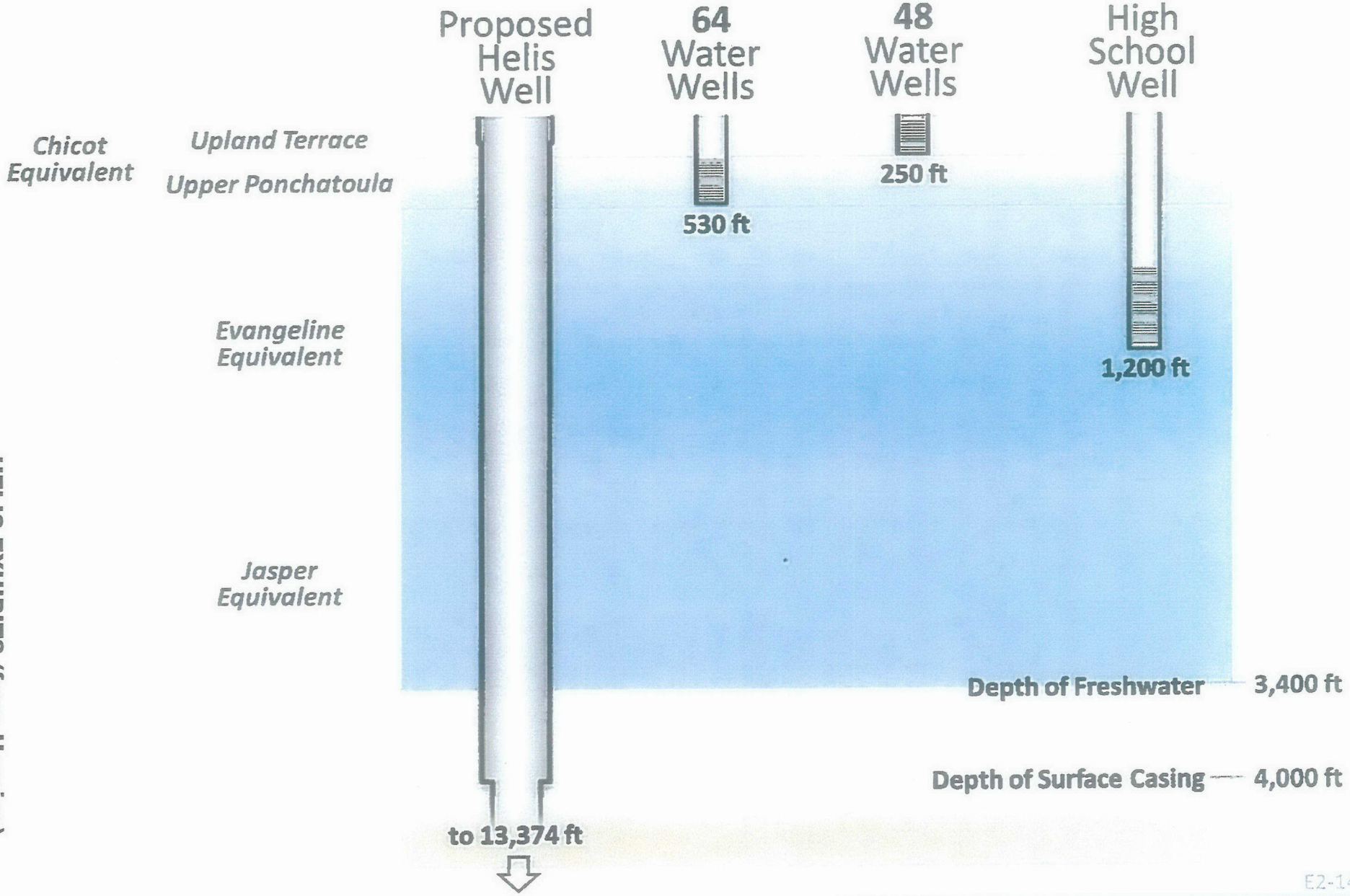


HELIS EXHIBITS (from Hearing)

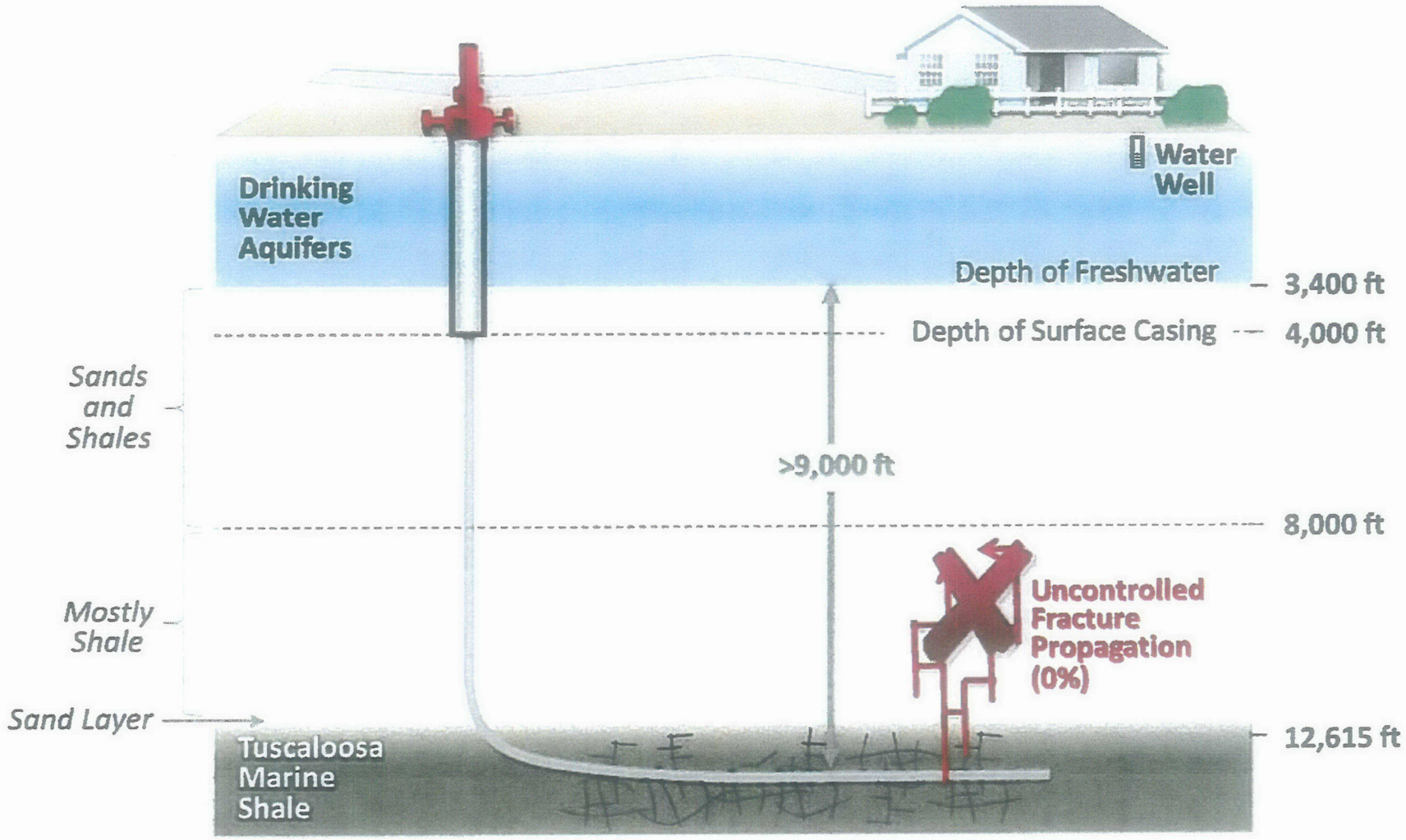
EZ-13

Depths of Water Wells Within a 2-mile Radius



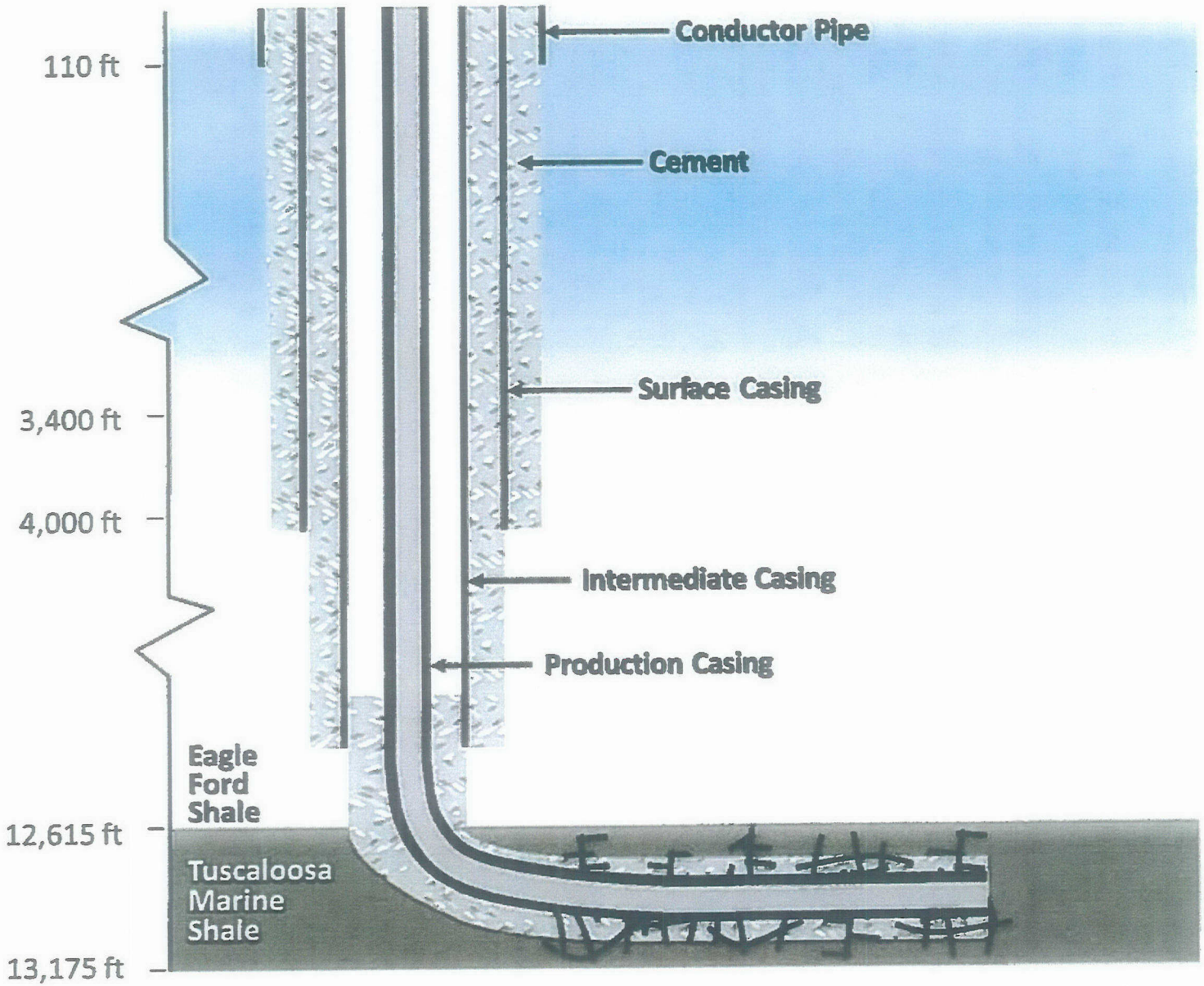
HELIS EXHIBITS (from Hearing)

Concerns Regarding Soil/Groundwater Impacts: Uncontrolled Fracture Propagation



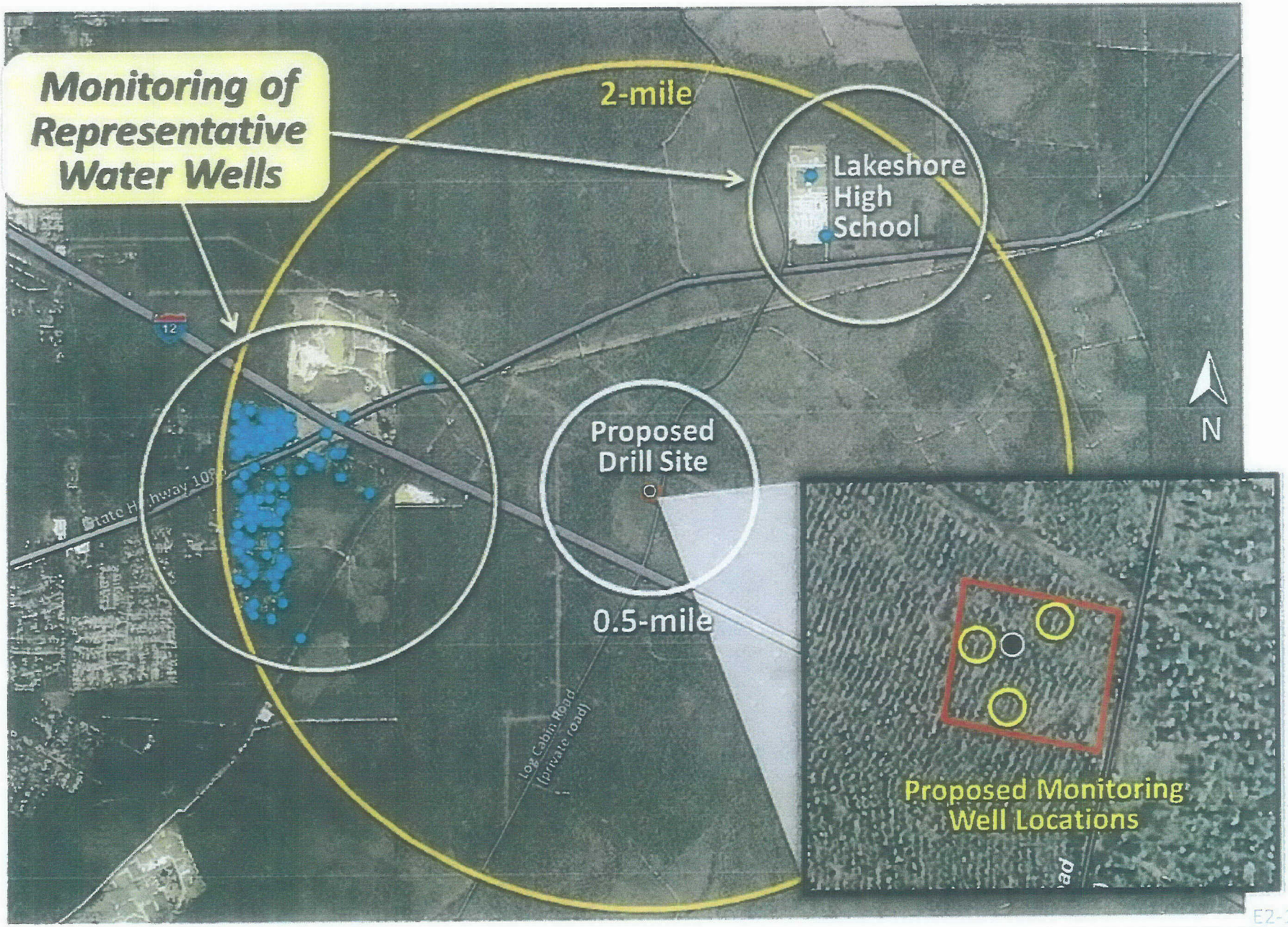
HELIS EXHIBITS (from Hearing)

How Will Helis Construct This Well to Protect Groundwater?



HELIS EXHIBITS (from Hearing)

Groundwater Monitoring Plan

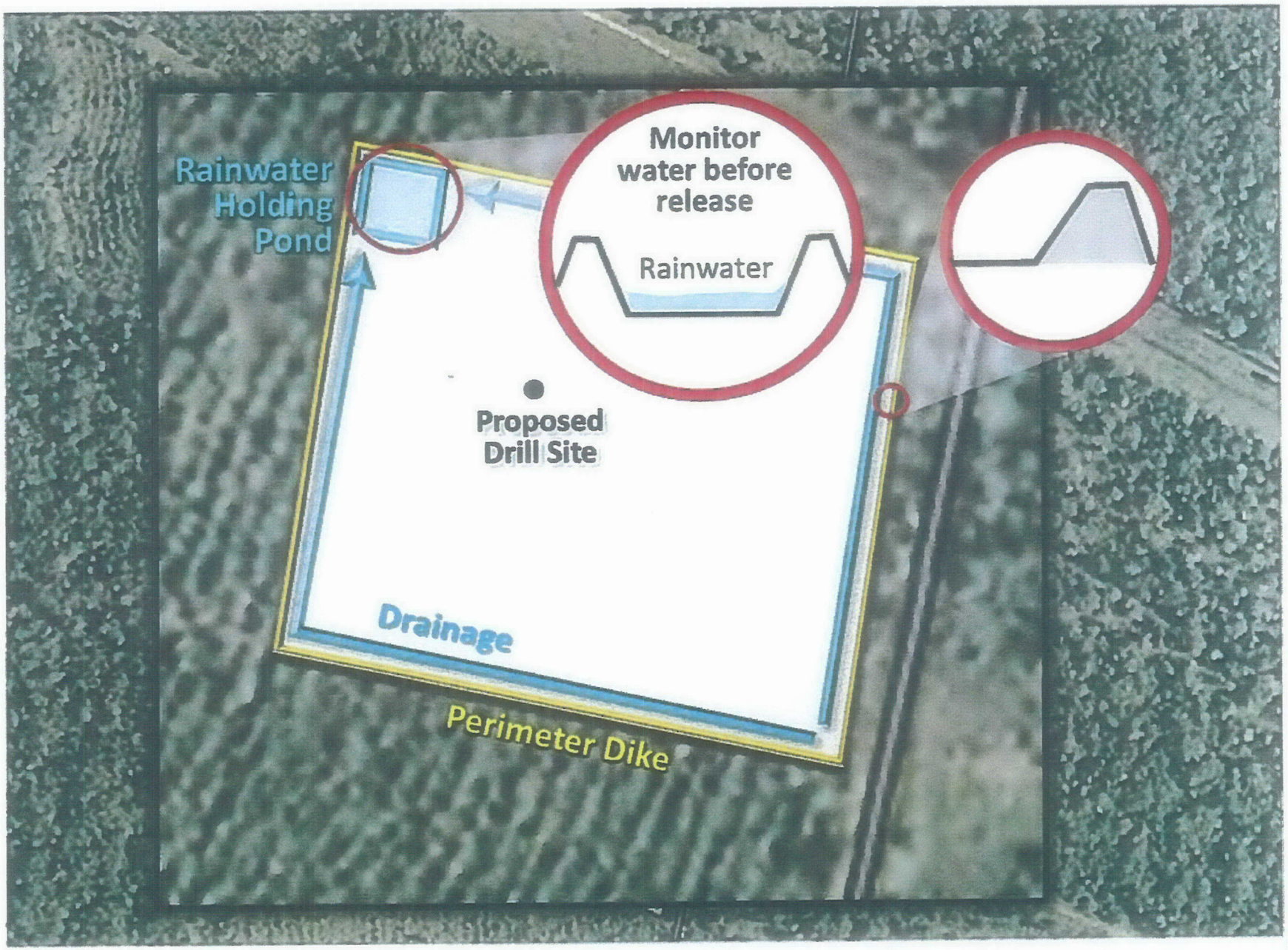


HELIS EXHIBITS (from Hearing)

Stormwater Management

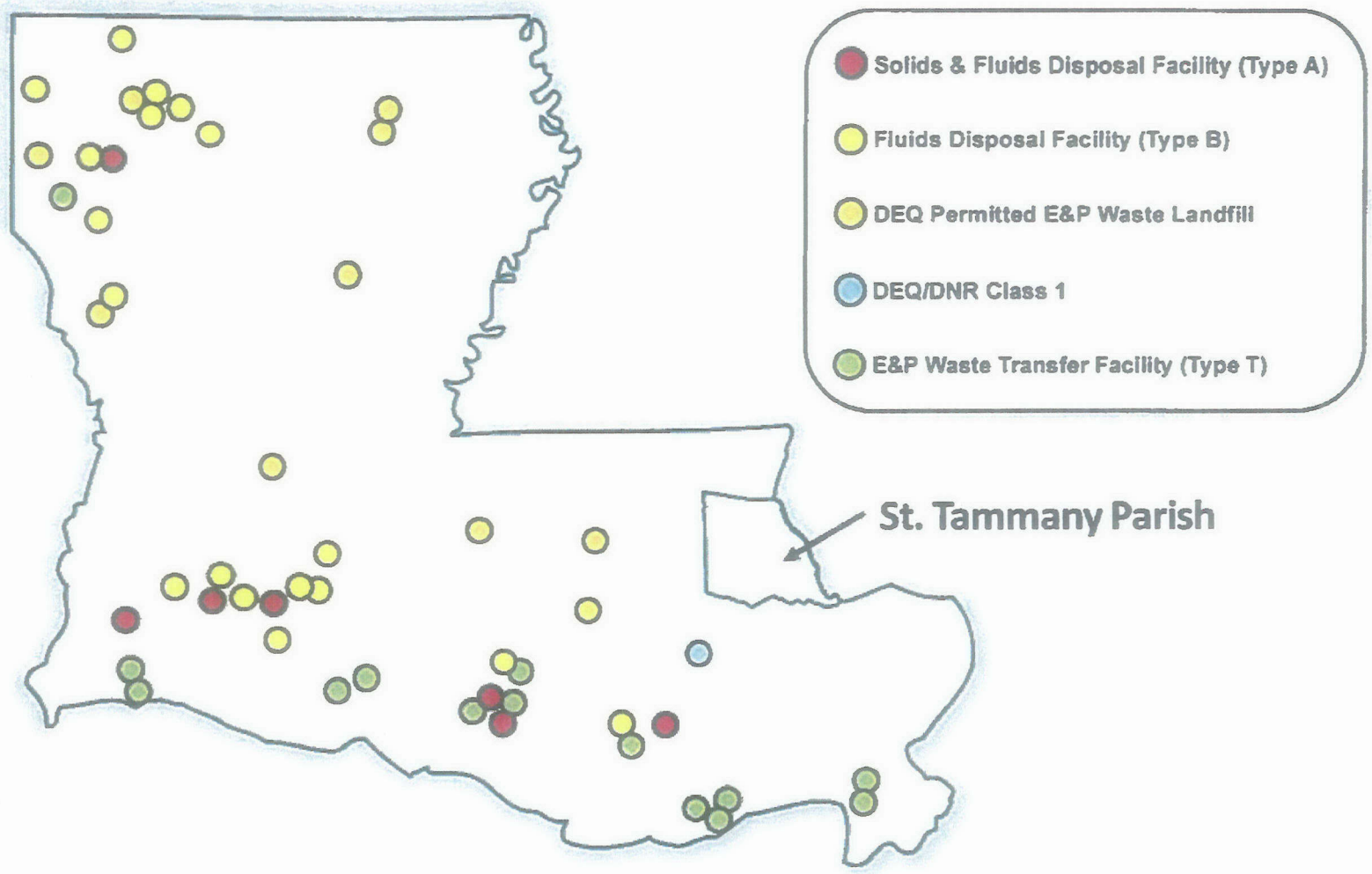
HELIS EXHIBITS (from Hearing)

Stormwater Management



HELIS EXHIBITS (from Hearing)

Disposal Sites in Louisiana



Solids and liquids will be transported out of St. Tammany Parish

SOURCE: LDNR, Office of Conservation, Geological Division. July 2, 2014.

HELIS EXHIBITS (from Hearing)

Wetlands – Permit & Siting Considerations

- Minimize impact to wetlands and critical habitats
- Minimize construction
- Maximize distance from local population
- Outside of Coastal Zone
- Target geological formation

Reviewed by LDEQ, USACE, LWF, and USEPA.
LA Geological Survey: *no less damaging feasible alternatives.*

SOURCE: Louisiana Geological Survey, 2014. Geological Review Recommendation.

HELIS EXHIBITS (from Hearing)

Threatened & Endangered Species
Dusky Gopher Frog

- This species has **not been in Louisiana since 1967**
- Today, **entire population living in 3 ponds** in Mississippi
- Ponds are over **60 miles** from Proposed site.

HELIS EXHIBITS (from Hearing)

SOURCE: Federal Register Vol. 77, No. 113. Tuesday, June 12, 2012, Rules and Regulations.
The Nature Conservancy, 2014, Dusky Gopher Frog Profile.

Threatened & Endangered Species
Dusky Gopher Frog

- **Critical habitat designated in St. Tammany Parish is over 10 miles from proposed site.**

SOURCE: Federal Register Vol. 77, No. 113. Tuesday, June 12, 2012, Rules and Regulations.
The Nature Conservancy, 2014, Dusky Gopher Frog Profile.

Additional Issues/Proposed Plans

Issues	Considered in Helis' Plans?
• Considerations for site selection	✓
• Groundwater protection	✓
• Water use	✓
• Spill prevention/stormwater management	✓
• Ecology and wetlands	✓
• Air Monitoring	✓
• Emergency response	✓
• Miscellaneous: noise, traffic, etc.	✓

HELIS EXHIBITS (from Hearing)